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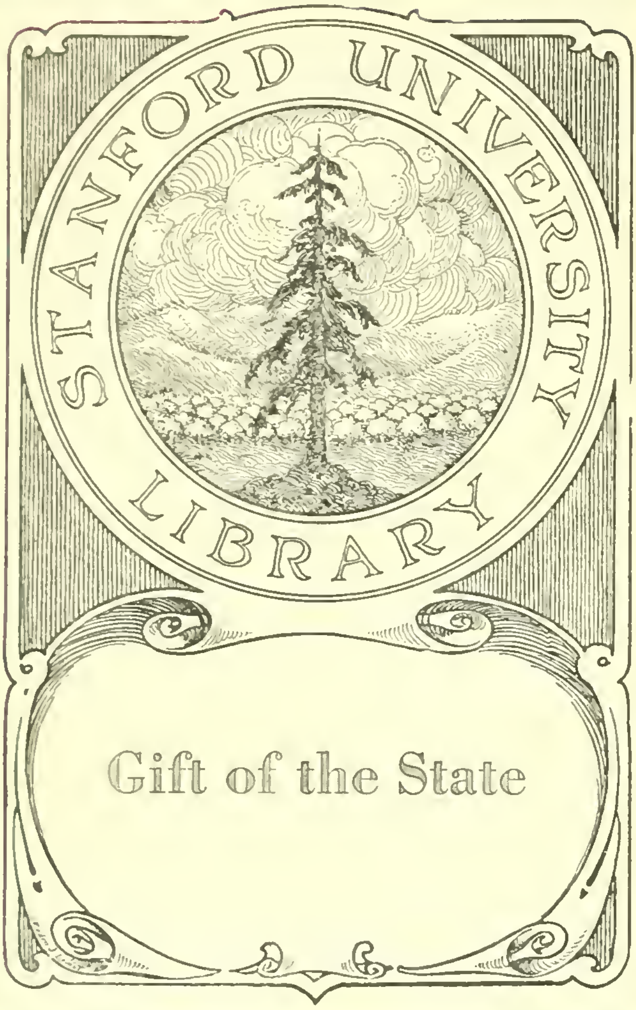

Sixth Biennial Report

OF THE

State Board of Health

OF

MONTANA

THIRD BIENNIAL REPORT

OF THE

State Registrar of Births and Deaths

1911 and 1912

THOS. D. TUTTLE, M. D., Secretary

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MEMBERSHIP OF THE MONTANA STATE BOARD OF HEALTH.

Hon. Edwin L. Norris, Governor, Helena.
Hon. A. J. Galen, Attorney General, Helena.
D. J. Donohue, M. D., President, Glendive.
M. E. Knowles, D. V. S., Vice President, Helena.
C. T. Pigot, M. D., Roundup.
C. E. K. Vidal, M. D., Great Falls.
T. D. Tuttle, M. D., Secretary, Helena.

DEPARTMENT OF PUBLIC HEALTH OF THE STATE OF MONTANA.

OFFICE OF THE SECRETARY,
Helena, Montana, December 10, 1912.

Hon. Edwin L. Norris, Governor,
Helena, Montana.

Sir—In compliance with the provisions of the Laws of Montana, I hand you herewith the Sixth Biennial Report of the State Board of Health of Montana.

Respectfully submitted,
T. D. TUTTLE, M. D.,
Secretary.

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DR. WILLIAM TREACY.

Died in Honolulu, January 17th, 1912. Dr Treacy was President of the State Board of Health from the time of its inception in 1901 up to the day of his death. During this time he never failed to be present at a meeting of the Board, except on one or two occasions when he was out of the State. No matter how busy he was, or how pressing other engagements might be, he always managed to be present and to take an active part in every meeting held by the State Board of Health.

Not only did he devote his time at these meetings, but he gave this work his most serious thought and study, and was always willing at any hour to consider any subject that might be under consideration by the State Board of Health, and devoted hours at a time in discussing the questions of preventive medicine and methods adopted by the State Board of Health with the Secretary and other members of the Board.

As President of the State Board of Health, he was also a member and President of the Live Stock Sanitary Board, and to this he gave the same thought and attention that he did to the work of the Board of Health.

In the death of Dr. Treacy the State of Montana has lost a citizen of inestimable value. Those who knew him well, loved him, not on account of a flattering disposition that sometimes attracts friendship of a short-lived character, but on account of his sterling worth and true friendship.

RECOMMENDATIONS

Local and County Health Officers.

At the meeting of the local and county health officers held at Helena in May, 1912, it was unanimously agreed that the present system of employing health officers is decidedly unsatisfactory, both to those employed and in regard to the character of the work rendered. It was therefore recommended that the law be so amended at the next Legislature so as, if possible, to leave the appointment of local and county health officers with the State Board of Health and to set a minimum salary to be paid health officers however they may be appointed. In connection with this, your attention is respectfully called to our report of the work performed under the Pure Food Law. See page 150 of this report.

Rocky Mountain Spotted (Tick) Fever.

We earnestly recommend a liberal appropriation for the continuance of the efforts made during the years 1911 and 1912, towards the eradication of this disease in our State and that a liberal appropriation be made for the continuance of this fight, also that the United States Congress be urged to make appropriation for a general fight against this disease in the states affected, to be carried on by the United States Public Health Service, and further, that a law be enacted to require the submission of all domestic animals to dipping with such material as may be designated to prevent the growth of ticks on such animals. See page 30 of this report.

Pure Food Law.

While we realize that an effort will be made to revoke or render ineffectual the law commonly known as the Pure Food Law (passed by the last Legislature) we respectfully request that you take into consideration the saving of lives that has resulted from the enforcement of this law, and that these lives be weighed against the objections that may be advanced to this law. We further request that in considering the question of placing the enforcement of the dairy portion of the Pure Food

Law with a dairy commissioner, that you remember that it is the ambition of the dairy commissioner to produce large returns from the dairies of our State, whereas it is the ambition of the Board of Health to save lives and at the same time to interfere as little as possible with the returns from our dairies, therefore, that the control of the dairies from a sanitary standpoint be left with the State Board of Health, while the dairy commissioner co-operates with the State Board of Health and at the same time teach the farmer the means by which the greatest quantity of a pure dairy product may be secured. See page 159 of this report.

Communicable Diseases.

As our Public Health Laws undertake to designate what shall be known as Communicable Diseases in this State, we earnestly recommend that the section defining what shall be known as Communicable Diseases be amended so as to include Tuberculosis, Infantile Paralysis (Anterior Poliomyelitis), and Whooping Cough. See page 9 of this report.

Air Space in Hotels, Boarding Houses, Etc.

As a result of a limited study of the sanitary conditions in the mines and on the surface, in Silver Bow county, we found in over five hundred houses examined that the air space in rented sleeping rooms is three hundred and twenty-five (325) cubic feet per individual occupying the rooms. In one instance the air space was reduced as low as one hundred (100) cubic feet per occupant. This condition exists to some extent in other parts of the State. In addition to the lack of air space in these rooms, we find that in all parts of the State rooms are rented to people suffering from tuberculosis, and after such rooms are vacated they are rented to others without any pretense at disinfection.

We therefore recommend an Act of Legislature prohibiting the renting of rooms for sleeping purposes in which the air space is less than six hundred and fifty (650) cubic feet per occupant, and that when any room or house has been occupied by any person suffering from tuberculosis or any other communicable disease, that such room or house be thoroughly disinfected before it is rented to any other individual.

Tuberculosis Sanitorium.

A recommendation relative to this institution may be out of place in this report. but the fact that the law requires that certain matters, particularly that the plans and specifications of the buildings of State institutions must meet with the approval of the State Health Officer, encourages us to make the following recommendation, namely: That a Superintendent's residence be provided at the Sanitorium, it being practically inhuman to ask any man to take his family or even go alone to such an institution and live in the same building, constantly in contact with those afflicted with the Great White Plague; and further, that in providing for the maintenance of this institution it be remembered that this is in reality a hospital where helpless people must be cared for and such care requires a liberal appropriation if the institution is to meet the ends for which it was created.

COMMUNICABLE DISEASES

In the matter of communicable diseases, we feel entitled to take a just pride in the showing we have been able to make in the reduction of the diseases over which we have control in the State.

In determining the result of this work we have based our opinion on the death returns, rather than on the number of that in the figures given with the records of deaths and cases records are practically complete, whereas we are confident that frequently communicable diseases are not all reported.

There are certain diseases which are communicable, but which are not classed as communicable diseases under our State law. For instance, tuberculosis, infantile paralysis, etc., are undoubtedly communicable diseases, and yet the laws of our State do not require that they be reported. neither is the State Board of Health authorized to require that they be reported. The last Legislature tried to remedy this defect. House Bill No. 112 passed the House, was slightly amended in the Senate and the House concurred in the amendment, but the bill was never signed by the Speaker of the House or the President of the Senate and never reached the Governor.

As evidence of the influence of energetic public health work on preventable diseases, we present the following: Please note that in the figures given with the records of deaths and cases reported in the following statements we do not take into consideration the increased population in the State, which, if taken into consideration would make our reduction in the deaths from preventable diseases far greater than we have presented.

In the study of the following tables presenting the cases reported, we wish to call your attention to the fact that cases reported from the larger cities having hospitals do not all originate in the cities, but are sent into the cities from the surrounding counties, and the source of infection is not the city but the locality from which the case came. However, we tabulate these cases as from the locality from which they were reported and not as the locality from which they were infected, it being impossible in many instances to determine just where infection occurred, and therefore report of an increased number of cases from the larger cities having hospitals does not indicate that the city itself is in an especially insanitary condition.

Smallpox.

As shown by Table I, in 1910 there were 607 cases of smallpox reported with two deaths, or a mortality of 0.32 per cent. In 1911 there were 318 cases reported with no deaths, and during the first nine months of 1912 there were 83 cases reported, showing a reduction of nearly 50 per cent from 1910 to 1911. The reduction for 1911 to 1912 is far greater than that occurring between 1910 and 1911, but we cannot give the per cent of reduction because we can only give the figures for nine months of 1912.

It will be recalled that in 1910 the State Board of Health took the stand that quarantine of smallpox is altogether unnecessary. That smallpox is prevented by vaccination and that there is no sense in quarantining people suffering from smallpox when those exposed will not contract the disease if they have been properly vaccinated. The majority of the counties continue to establish, more or less generally, a quarantine for this disease, but the quarantine has but little influence. For instance, in Fergus County, the people are opposed to vaccination and the County Board of Health establishes quarantine, but there were 40 cases reported from Fergus County during the nine months of 1912, or nearly 50 per cent of the entire number of cases reported in the State.

Thirty-one cases of smallpox were reported from Teton County. This number of cases was entirely due to the fact that the disease was diagnosed as chickenpox and the children suffering from this so-called chickenpox were permitted to go to school until a virulent case developed. This case was in a boy about sixteen years old and he died later in the year, his death being reported as due to nephritis, or Bright's disease, but his Bright's disease was the result of smallpox that had been called chickenpox, and had the physician in charge recognized this disease when it first broke out in the community the people would have been vaccinated and this boy would be alive today. Thus over three-fourths of the cases reported in 1912 were due to opposition to vaccination in one county and to failure on the part of an unlicensed physician to make a proper diagnosis in another county.

During three years we show a total of 1,008 cases of smallpox reported with only two deaths, whereas if a single case of smallpox occurs in a community we have the strongest support of that community in suppressing this disease. On the other hand we find that in 1911 there were 52 deaths from measles (we do not know how many cases occurred because this disease is not suffiiciently reported to enable us to determine the number of cases in the State), but the same people that will furnish us with the strongest support in suppressing smallpox will laugh at the idea of quarantining measles or attempting any way to suppress this disease. Mothers will even deliberately expose their children to measles with the idea that they must have this disease, but they would consider a mother who exposed her child to smallpox as insane, and yet there is no question but that in 1911 measles killed 52 people in this State while smallpox killed none.

Scarlet Fever.

In this disease we can show a very decided reduction, both in the number of cases reported and in the number of deaths that have occurred therefrom. We believe that the cases were not as completely reported in 1910 as they were in 1911 or 1912, this belief being based on the fact that in 1910 the death rate from scarlet fever was 6.1 per cent, while in 1911 it was 4.9 per cent and in 1912 4.5 per cent.

A study of Table 2 shows that the cases are not completely reported in all the counties as indicated by the death rate from the disease. For instance, in Chouteau County in 1910 there was a death rate of 31.2 per cent. In Missoula County there was a death rate of 20 per cent and in Yellowstone County a death rate of 19.2 per cent. It is not at all probable that the disease assumed such a highly malignant form in these counties and such a mild form in Anaconda, for instance, where the death rate was 4.3 per cent. On the other hand, it is far more probable that the cases were simply not reported by the attending physicians and that the health officers did not take the trouble to find out whether cases were reported or not.

In 1911 we find that the highest death rate was 16.6 per cent, occurring in Missoula County. We do not believe that there was a death rate of 16.6 per cent occurring in Missoula County from scarlet fever, but that there were several cases that were not reported. There were probably as many cases that were not reported in Missoula County in 1911 as were reported.

In 1912 the only place that we find an abnormally high mortality was in Flathead County, where only two cases were reported with one death. It is very probable that there were a good many more cases in Flathead County and that these cases were not reported.

In the deaths from this disease, we note that in 1910 there were 57, whereas in 1911 there were only 33, or a reduction in the number of deaths of 42 per cent, but taking the death records for 1908, 1909, 1910 and 1911 we note that in 1908 there were 80 deaths from scarlet fever, whereas there were only 33 in 1911, or a reduction of 58.7 per cent in four years. During the nine months of 1912 there were 17 deaths from scarlet fever, and unless we should have a very unusual outbreak during the next three months, we can safely say that during 1912 we will show a reduction of nearly, if not quite, 75 per cent over the deaths from scarlet fever in 1908.

This reduction in deaths from scarlet fever did not occur in a spasmodic manner. For instance, in 1908 there were 80 deaths; in 1909, 63 deaths; in 1910, 57 deaths; in 1911, 33 deaths and in the nine months of 1912 only 17 deaths. The reduction, therefore, is not due to lack of epidemics, but to constant work against this disease. As to where this disease is found and where the deaths have occurred, your attention is respectfully called to Table No 2 of this report.

Diphtheria.

With regard to diphtheria, there is practically the same to say that we have said with regard to scarlet fever. During 1910, there were 485 cases reported. During 1911, 221 cases were reported, or a reduction of over 50 per cent. During the nine months of 1912 there were 99 cases reported, and if we are able to maintain this reduction for the next three months we can show another reduction of 50 per cent over 1911.

With regard to the deaths, we find that the death rate in 1910 was 12.6 per cent, in 1911 it was 1.3 per cent, in 1912 thus far it shows 4 per cent, indicating that the cases were more thoroughly reported both in 1911 and 1912 than they were in 1910, and further that they were thoroughly reported in 1910 1910, and further that they were more thoroughly reported in 1910 than they have been thus far in 1912. But in some localities completely at any time.

It may be claimed by some that using the death rate as an indication for complete reports of communicable diseases is not a fair test, but those who make this claim must either admit the high mortality or the incomplete reports, and we do not believe the doctors in a community are willing to admit an extremely high death rate from any disease as compared with the death rate in adjoining communities and will undoubtedly admit that the cases are not completely reported, which throws us back on the health officer not performing his duty in filing complaints against those who fail to report communicable diseases.

In regard to the further study of deaths from this disease, we find that in 1908 there were 149 deaths from diphtheria, whereas in 1911 there were only 30 deaths, or a reduction of 79 per cent in the deaths from diphtheria in four years. That this reduction has not been of a spasmodic character is shown by the fact that in 1908 there were 149 deaths from this disease, in 1909, 83; in 1910, 61, and in 1911, 30. In the nine months of 1912 there have been only 5 deaths, and if we are able to maintain this ratio for the next three months we will show a reduction of 66 2-3 per cent over the 1911 records.

For a detailed study of where the cases of diphtheria and deaths therefrom during 1910-11 and the first nine months of 1912 occurred, your attention is respectfully called to Table No 3.

Typhoid Fever.

In regard to this disease, we note a steady reduction in the number of cases reported and also in the number of deaths therefrom during the years 1910-11-12, there being 886 cases reported in 1910, 435 in 1911, and 249 during the first nine months of 1912.

In 1910 there were 147 deaths, or a death rate of 17.5 per cent, in 1911 there were 80 deaths or a death rate of 18.3 per cent, in 1912 there were 39 deaths or a death rate of 15.6 per cent. This death rate is entirely too high for typhoid fever and we have therefore estimated the number of cases that should have been reported, granting a death rate of 10 per cent, which is entirely too high. Granting this death rate of 10 per cent, however, there should have been reported in 1910, 1.470 cases, in 1911, 800 cases, and in 1912 390 cases. Table No. 4 sets forth in detail where these cases should have ben reported and where the death rate has exceeded 10 per cent.

A further study of deaths from this disease is set forth in Table No. 5, showing that in 1908 there were 128 deaths from typhoid fever, in 1909, 97 deaths and in 1911 there were 80 deaths. Thus we show a reduction in deaths from typhoid fever during the four years of 48, or 38 per cent.

In 1910 there was a severe outbreak of typhoid fever at Great Falls and at Laurel. The cases occurring at Laurel were not reported entirely from Yellowstone County, many of these cases being sent to Missoula where a diagnosis was made and they were reported from there. The outbreak at Laurel was due to an improperly constructed sewer and water system and was a direct result of an effort to save money in constructing these systems. We presume the money was saved, but the lives were not.

Another severe outbreak occurred at Great Falls in 1910. The people of Great Falls seem very sensitive with regard to anything being said relative to conditions there. Therefore, we leave it for you, as the Governor of this State, and to the Legislators of this State to determine whether or not their sensibilities are more important than the lives of the people.

In regard to typhoid fever, while we show a marked reduction, both in number of cases reported and in the deaths resulting therefrom, we are still handicapped in our fight against this disease. In the first place we have not been able to secure the generous co-operation of the people in our State in the fight against the fly that is now being waged by nearly all of the States in the Union. We hope, however, to secure a more generous co-operation on the part of the people in this fight now that it is shown that the fly not only carries typhoid fever and other preventable diseases, but that the fly, known as the "barn fly" (we do not refer to the horse fly) which frequents the neighboring houses, transmits the fatal disease known as infantile paralysis. But we cannot hope to secure a decided eradication of the fly by the swatting process. We must learn that it is necessary to remove the hatching places of the fly before we can do away with him, and that his hatching places are the manure piles, open garbage cans and other sources of filth, and until our people find that it is less expensive to keep manure, garbage cans, etc., covered than it is to pay doctors' bills, typhoid fever will prevail in our communities.

Another important matter with regard to typhoid fever and all other enteric diseases is the pollution of our water supplies. In 1907 the Legislature of this State passed a law prohibiting the putting of sewage into any stream in the State unless such sewage had been purified to the satisfaction of the State Board of Health. We planned two years, preparing the people for the enforcement of this law, especially the cities of the State. In 1909 we were tied up with a law suit pending before the Supreme Court relative to the constitutionality of this law. The Supreme Court ruled in behalf of the State Board of Health.

We then issued orders to cities, corporations, etc., having sewer systems emptying into streams to prepare plans for purifying their sewage. We were again held up in one way and another until the Legislature of 1911 convened, at which time the law was so amended as to require the State Board of Health to show that a particular sewer system was a detriment or a danger to public health. In other words that a sewer system must be permitted to kill a few or many people before any action can be taken relative thereto.

This matter was strongly brought home to us in the summer and early fall of 1912, when an outbreak of typhoid fever occurred at Gardiner. This outbreak was undoubtedly due to sewage, either emptied directly into the Gardiner river or washed into the river from the toilets at the various camps in the Park, the latter source being the more probable one, as the outbreak promptly followed a heavy storm that had caused a large amount of surface wash to enter the river. But regardless of all practical evidence that this disease at Gardiner resulted from the pollution of the water in this way, it would be impossible to prove just where the infection occurred, and it would be the same thing with regard to proving the damage done by any other sewer system. In other words the amendment made to what is known as the "Sewage Pollution Law" practically destroyed the efficiency of this law, the State Board of Health being called upon to prove something that it is almost impossible to prove.

But on the other hand we wish to call your attention to the fact that Pennsylvania, operating under practically the same law that we had before the Legislature amended it in 1911, has in five years reduced the death rate in the entire State of Pennsylvania by 75 per cent, but we presume that the fact that the population of our State is increasing so rapidly it is far more important that our cities spend money in other ways than that of protecting the lives of the people who may live on the streams below them. "With so many people coming into the State a few deaths from any preventable disease is a matter of comparatively little importance, when compared to that of our cities making a good surface showing in order that the town lots may be sold at a higher price."

Tuberculosis.

Tuberculosis is not classed as a communicable disease under the laws of this State. Our people are just beginning to wake up to the fact that this disease prevails extensively in Montana. We will find today people who will say that there is no tuberculosis in Montana, and yet reference to Table 5 shows that in 1908 there were 315 deaths from this disease, in 1909 there were 320 deaths, in 1910 there were 343 and in 1911, 420 deaths.

This decided increase in 1911 is more apparent than true because 1911 is the first year we had death returns from the Indian reservations and the death records show a higher death rate among the Indians from tuberculosis than prevails among the white people. However, the steady increase in 1909 and 1910 over 1908 indicates a constant increase in this disease among our people and shows the wisdom of the last Legislature in appropriating money to provide a sanatorium for those afflicted with the great white plague.

TABLE A.—DEATH RATE, EXCLUSIVE OF INDIANS, FROM TUBERCULOSIS IN THE STATE DURING THE YEARS 1909–1910–1911.

OCCUPATION.	Total Deaths from All Causes.	Under 20 Years of Age.	20 to 30 Years of Age.	30 to 40 Years of Age.	Over 40 Years of Age.	Total.	Death Rate per 100 Deaths.
Metal Miners	1,050	1	26	78	191	296	28.1
Railroad Employees	439	....	3	8	4	15	3.4
Merchant	131	....	2	2	5	9	6.8
Housewife	1,884	2	57	50	45	154	8.2
Farmer	1,310	4	20	16	44	84	6.4
Saloonkeeper	165	....	4	7	13	24	14.5
Laborer	952	1	25	24	37	87	8.2
Carpenter	169	3	....	6	....	9	5.3
Domestics	185	7	14	5	1	27	14.6
Coal Miner	131	....	....	5	....	5	3.8
Smelterman	111	....	1	....	10	11	9.9
All Other	5,117	114	29	27	43	213	4.1
Totals	11,644	132	181	228	393	934	8.0

TABLE B.—DEATH RATE, EXCLUSIVE OF INDIANS, FROM TUBERCULOSIS IN SILVER BOW COUNTY DURING THE YEARS 1909–1910–1911.

OCCUPATION.	Total Deaths from All Causes.	Under 20 Years of Age.	20 to 30 Years of Age.	30 to 40 Years of Age.	Over 40 Years of Age.	Total.	Death Rate per 100 Deaths.
Miner	782	1	24	74	172	271	36.4
Railroad Employees	44	....	....	1	1	2	4.5
Merchants	24	....	....	2	....	2	8.3
Housewife	395	....	18	15	9	42	10.6
Farmers	51	....	....	....	7	7	13.7
Saloonkeepers	57	....	....	5	8	13	22.8
Laborers	126	....	3	7	10	20	15.8
Carpenters	18	....	....	3	....	3	16.6
Domestics	54	....	1	1	....	2	3.7
Coal Miners	....	....	....	....	....	....	....
Smeltermen	24	1	....	....	6	7	29.2
All Others	1,047	20	7	7	20	54	5.1
Totals	2,622	22	53	115	233	423	16.1

TABLE C.—DEATHS, EXCLUSIVE OF INDIANS, FROM TUBERCULOSIS IN THE STATE EXCLUSIVE OF SILVER BOW COUNTY DURING THE YEARS 1909–1910–1911.

OCCUPATION.	Total Deaths from All Causes.	Under 20 Years of Age.	20 to 30 Years of Age.	30 to 40 Years of Age.	Over 40 Years of Age.	Total.	Death Rate per 100 Deaths.
Metal Miner	268	....	2	4	19	25	8.9
Railroad Employe	395	....	3	7	3	13	3.3
Merchant	107	....	2	2	3	7	6.5
Housewife	1,589	42	39	35	36	112	7.0
Farmer	1,259	4	20	16	37	77	7.1
Saloonkeeper	103	....	4	2	5	11	10.2
Laborer	826	1	22	17	27	67	8.1
Carpenter	151	3	....	3	....	6	3.9
Domestic	131	7	13	4	1	25	18.8
Coal Miner	131	....	....	5	4	9	3.8
Smelterman	87	....	....	....	4	4	4.6
All Others	4,070	94	22	20	23	159	3.9
Totals	9,022	111	127	115	162	511	5.6

Measles.

Though classed as a communicable disease under the laws of our State, we have been unable to convince the people that this is a dangerous disease. As previously stated the presence of a case of smallpox in a community immediately elicits the support of the people in fighting the spread of the disease, but the presence of measles causes no anxiety whatever, and mothers have been known to expose their children to this disease.

This lack of care relative to measles has resulted in the death of a comparatively large number of our people. In 1908 there were 17 deaths from measles, in 1909, 9; in 1910, 16 deaths and in 1911, 52, or a total of 94 deaths in four years.

No matter how energetic a health officer may be, he cannot locate measles and prevent the spread thereof, when no physician is called and the cases are not reported by the householders. We believe that measles and whooping cough will not be controlled until we have adequate medical inspection of our schools.

For a detailed study of the location of cases reported and deaths from this disease, your attention is respectfully called to Table 5.

Whooping Cough.

What has been said of measles is entirely applicable to whooping cough and yet we find that in 1908 whooping cough caused 13 deaths, in 1909, 36 deaths; in 1910, 33, and in 1911, 26, or a total of 108 deaths in four years. These conditions are not only true of Montana, but are true of other states. A study of the death records as presented by the United States Census Bureau shows that whooping cough causes more deaths than does scarlet fever and that measles causes more deaths than does scarlet fever. The fight against these two so-called harmless diseases cannot be effectively carried on until the people wake up to their gravity. (See Table 5.)

Enteric Diseases.

Diarrhea among children is not a communicable disease as a rule and is not classed as a communicable disease, but it is a preventable disease. It is a disease that results from uncleanly conditions and from impure or improperly administered foods.

The deaths from this disease show most markedly the influence of sanitary measures on deaths. In a study of the deaths occurring during the nine months of 1910-1911 and 1912 we find that in 1910 there were 246 deaths among the children of this State from enteric diseases. In 1911 this death rate dropped to 160, whereas in 1912 we find the deaths from this disease reduced to the small number of 59. The reduction between 1910 and 1911 was due to the general sanitary improvements and education of the people along the lines of the importance of keeping things clean in order to preserve the health of children, while the reduction in 1912 over that of 1911 we attribute almost, if not entirely, to the improvement in the dairies from which almost all of the food for our infants comes. For a more detailed study of this disease your attention is respectfully called to Table No. XII.

TABLE NO. 1.—SMALLPOX, 1910–1911–1912.

COUNTY.	1910.			1911.			1912.		
	Cases Reported.	Deaths Reported.	Per Cent Mortality.	Cases Reported.	Deaths Reported.	Per Cent Mortality.	Cases Reported.	Deaths Reported.	Per Cent Mortality.
Beaverhead	14	...	...	11	(*)	...	6	(**)	...
Broadwater	2	...	...	...	...	...	...	...	...
Carbon	6	...	...	1	...	...	3	...	...
Cascade (Excl. of)	2	...	...	26	...	...	6	...	...
Great Falls	8	...	...	33	...	...	8	...	...
Chouteau	7	...	...	46	...	...	16	...	...
Custer	5	1	20.0	6	...	...	9	...	...
Dawson	18	...	...	13	...	...	3	...	...
Deer Lodge (Excl. of)	...	...	...	...	...	...	...	...	...
Anaconda	3	1	33.3	15	...	...	...	...	...
Fergus	9	...	...	1	...	...	40	...	...
Flathead (Excl. of)	5	...	...	4	...	...	1	...	...
Kalispell	...	...	...	...	...	...	...	...	...
Gallatin (Excl. of)	3	...	...	3	...	...	...	...	...
Bozeman	...	...	...	...	...	...	...	...	...
Granite	...	...	...	1	...	...	...	...	...
Jefferson	3	...	...	10	...	...	...	...	...
Lewis & Clark (Ex. of)	21	...	...	...	...	...	...	...	...
Helena	11	...	...	4	...	...	2	...	...
Lincoln	1	...	...	2	...	...	9	...	...
Madison	2	...	...	...	...	...	...	...	...
Meagher	10	...	...	...	...	...	13	...	...
Missoula (Excl. of)	17	...	...	8	...	...	3	...	...
Missoula City	16	...	...	11	...	...	4	...	.
Musselshell	...	...	...	1	...	...	1	...	...
Park (Excl. of)	9	...	...	1	...	...	...	...	...
Livingston	4	...	...	...	...	...	...	...	...
Powell	3	...	...	6	...	...	...	...	...
Ravalli	8	...	...	9	...	...	5	...	...
Rosebud	8	...	...	...	...	...	...	...	...
Sanders	8	...	...	8	...	...	...	...	...
Silver Bow (Excl. of)	79	...	...	13	...	...	1	...	...
Butte	318	...	...	62	...	...	10	...	...
Sweet Grass	...	...	...	2	...	...	...	...	...
Teton	3	...	...	12	...	...	31	...	...
Valley	...	...	...	7	...	...	12	...	...
Yellowstone (Excl. of)	2	...	...	...	...	...	...	...	...
Billings	2	...	...	2	...	...	...	...	...
Totals	607	2	0.32	318	...	...	83	...	...

(*) There were no deaths from smallpox in 1911.
(**) There were no deaths from smallpox in 1912.
NOTE—For the year 1912 the first nine months only are given.

TABLE NO. II.—SCARLET FEVER, 1910-1911-1912.

COUNTY.	1910.			1911.			1912.		
	Cases Reported.	Deaths Reported.	Per Cent Mortality.	Cases Reported.	Deaths Reported.	Per Cent Mortality.	Cases Reported.	Deaths Reported.	Per Cent Mortality.
Beaverhead	45	3	6.6	26	3	11.5	2	...	...
Broadwater	33	4	12.1	...	...	...	8	...	...
Carbon	12	2	16.6	25	...	...	52	...	...
Cascade (Excl. of)	12	...	...	7	...	...	8	...	...
Great Falls	20	2	10.0	25	3	12.0	2	...	...
Chouteau	32	1	31.2	22	...	...	12	...	...
Custer	11	2	18.1	17	2	11.7	10	...	...
Dawson	54	...	...	20	1	5.0	2	...	...
Deer Lodge (Excl. of)	...	...	...	1	...	...	...	...	...
Anaconda	23	1	4.3	7	...	...	3	...	...
Fergus	40	...	...	41	1	2.2	7	...	...
Flathead (Excl. of)	48	5	10.4	6	...	...	2	1	50.0
Kalispell	...	...	...	...	...	...	...	...	...
Gallatin (Excl of)	20	...	...	26	2	7.7	31	1	3.2
Bozeman	6	...	...	17	...	...	19	...	...
Granite	1	...	...	6	...	...	...	...	...
Jefferson	9	...	...	4	...	...	...	...	...
Lewis & Clark (Ex. of)	32	1	3.1	33	1	3.0	...	...	...
Helena	21	2	9.5	57	4	7.0	...	...	...
Lincoln	...	...	...	19	...	...	3	...	...
Madison	21	1	4.7	9	1	11.1	1	...	...
Meagher	14	1	7.1	3	...	...	6	...	...
Missoula (Excl. of)	5	1	20.0	6	1	16.6	12	...	...
Missoula City	16	...	10.0	19	...	...	11	...	...
Musselshell	2	...	...	34	1	2.9	1	...	...
Park (Excl. of)	10	1	10.0	4	...	...	...	...	...
Livingston	7	...	...	11	...	...	2	...	...
Powell	5	...	...	10	1	10.0	2	...	...
Ravalli	17	...	...	10	1	10.0	...	...	...
Rosebud	...	...	...	...	...	...	...	...	...
Sanders	2	...	...	6	...	...	...	...	...
Silver Bow (Excl. of)	75	4	5.3	48	3	6.2	86	12	13.9
Butte	269	19	7.0	58	7	12.0	59	1	1.7
Sweet Grass	8	...	...	1	...	...	...	...	...
Teton	18	1	5.5	30	...	...	17	1	5.9
Valley	5	...	...	...	...	...	2	...	...
Yellowstone (Excl. of)	26	5	19.2	22	...	...	9	1	11.1
Billings	12	1	8.3	42	1	2.3	5	...	...
Totals	931	57	6.1	672	33	4.9	374	17	4.5

NOTE—For the year 1912 the first nine months only are given.

TABLE NO. III.—DIPTHTHERIA, 1910–1911–1912.

COUNTY.	1910.			1911.			1912.		
	Cases Reported.	Deaths Reported.	Per Cent Mortality.	Cases Reported.	Deaths Reported.	Per Cent Mortality.	Cases Reported.	Deaths Reported.	Per Cent Mortality.
Beaverhead	11	3	27.2	...	...	...	2	...	...
Broadwater	2	...	...	1	1	100.0	...	...	...
Carbon	7	2	28.5	13	4	30.7	3	...	...
Cascade (Excl of)	16	3	18.8	17	3	17.6	6	...	...
Great Falls	36	5	13.9	10	...	...	...	...	...
Chouteau	20	3	15.0	21	4	19.0	15	1	6.6
Custer	14	1	7.1	3	...	...	2	...	...
Dawson	36	4	11.1	23	3	13.0	10	1	10.0
Deer Lodge (Excl. of)	...	...	...	...	...	...	...	...	...
Anaconda	42	9	21.4	25	3	12.0	5	...	...
Fergus	28	3	10.6	3	...	...	3	...	...
Flathead (Excl. of)	1	1	100.0	4	...	...	...	...	...
Kalispell	...	...	...	...	...	...	...	...	...
Gallatin (Excl. of)	3	1	33.3	4	...	...	1	...	...
Bozeman	3	...	...	1	...	...	...	...	...
Granite	1	...	...	...	...	...	1	...	...
Jefferson	5	1	20.0	2	...	...	3	...	...
Lewis & Clark (Ex. of)	5	...	...	...	...	...	...	...	...
Helena	12	1	8.3	1	...	...	4	...	...
Lincoln	2	...	...	1	...	...	2	...	...
Madison	7	2	28.5	1	1	100.0	6	1	16.6
Meagher	1	1	100.0	2	...	...	...	...	...
Missoula (Excl. of)	2	1	50.0	4	...	...	1	...	...
Missoula City	24	...	...	6	...	...	3	...	...
Musselshall	...	...	...	1	...	...	...	...	...
Park (Excl. of)	3	1	33.3	1	...	...	...	...	...
Livingston	14	...	...	2	1	50.0	2	1	50.0
Powell	3	...	...	...	...	...	4	...	...
Ravalli	19	1	5.2	9	1	11.1	2	...	...
Rosebud	5	...	...	...	2	100.0	...	...	...
Sanders	1	...	...	1	...	...	...	...	...
Silver Bow (Excl. of)	34	6	17.6	10	1	10.0	6	1	16.6
Butte	84	5	5.9	22	2	9.0	10	...	...
Sweet Grass	1	1	100.0	1	...	...	2	...	...
Teton	...	...	...	1	...	...	...	...	...
Valley	3	...	...	10	2	20.0	1	...	...
Yellowstone (Excl. of)	15	1	6.6	4	1	25.0	2	...	...
Billings	25	5	20.0	17	1	5.8	3	...	...
Totals	485	61	12.6	221	30	1.3	99	5	4.0

NOTE—For the year 1912 the first nine months only are given.

TABLE NO. IV.—TYPHOID FEVER, 1910–1911–1912.

COUNTY.	1910.				1911.				1912.			
	Cases Reported.	Deaths Reported.	Per Cent Mortality.	Allowing 10% Mortality, No. of cases that should have been reported.	Cases Reported.	Deaths Reported.	Per Cent Mortality.	Allowing 10% Mortality, No. of cases that should have been reported.	Cases Reported.	Deaths Reported.	Per Cent Mortality.	Allowing 10% Mortality, No. of cases that should have been reported.
Beaverhead	1	2	100.0	20	...	..	....	......	1	1	10.0	10
Broadwater	1	...	....	......	1	..	....	......	...	..	....	......
Carbon	56	4	7.1	40	35	5	14.3	50	6	1	16.6	10
Cascade (Excl. of)	42	6	14.3	60	12	2	18.8	20	...	..	....	......
Great Falls	157	28	17.7	280	18	5	31.1	50	30	3	10.0	30
Chouteau	22	5	22.7	50	29	5	17.2	50	20	1	5.0	10
Custer	18	10	5.5	100	22	7	31.3	70	22	3	25.0	30
Dawson	25	...	....	......	31	5	16.1	50	12	3	25.0	30
Deer Lodge (Excl. of)	...	...	....	......	...	..	....	......	...	..	....	......
Anaconda	1	1	100.0	10	...	..	....	......	...	..	....	......
Fergus	63	8	12.7	80	18	3	16.6	30	25	3	12.0	30
Flathead (Excl. of)	97	10	10.3	100	30	1	3.3	10	2	1	50.0	10
Kalispell	...	...	....	......	13	2	15.4	20	14	3	21.4	30
Gallatin (Excl. of)	21	5	23.8	50	18	4	22.2	40	2	1	50.0	10
Bozeman	...	...	....	......	3	..	....	......	2	..	....	......
Granite	...	...	....	......	...	..	....	......	2	1	50.0	10
Jefferson	6	2	33.3	20	12	2	18.8	20	3	1	33.3	10
Lewis and Clark (Ex. of)	3	1	33.3	10	9	1	11.1	10	1	1	100.0	10
Helena	24	6	25.0	60	16	3	18.7	30	19	..	....	......
Lincoln	10	...	....	......	2	..	....	......	...	..	....	......
Madison	2	...	....	......	4	1	25.0	10	1	..	....	......
Meagher	4	...	....	......	6	..	....	......	3	1	33.3	10
Missoula (Excl. of)	2	1	50.0	10	3	2	66.6	20	4	1	25.0	10
Missoula City	51	13	25.4	130	34	4	11.7	40	6	5	83.3	50
Musselshell	...	...	....	......	3	1	33.3	10	8	1	12.5	10
Park (Excl. of)	4	1	25.0	10	4	1	33.3	10	19	1	5.2	10
Livingston	13	3	23.0	30	2	..	....	......	9	..	....	......
Powell	5	...	....	......	2	1	50.0	10	...	..	....	......
Ravalli	8	2	25.0	20	2	1	50.0	10	2	1	50.0	10
Rosebud	7	1	11.3	10	7	..	....	......	1	2	100.0	20
Sanders	2	...	....	......	7	..	....	......	1	..	....	......
Silver Bow (Excl. of)	7	3	42.8	30	...	..	....	......	...	1	100.0	10
Butte	9	10	100.0	100	9	8	88.8	80	...	1	100.0	10
Sweet Grass	6	1	16.6	10	3	..	....	......	...	..	....	......
Teton	10	3	30.0	30	13	2	16.4	20	...	1	100.0	10
Valley	22	9	40.9	90	12	3	25.0	30	...	..	....	......
Yellowstone (Excl. of)	38	...	....	......	18	3	16.6	30	11	..	....	......
Billings	99	12	12.1	120	37	8	21.6	80	18	1	5.5	10
Totals	836	147	17.5	1470	435	80	18.3	800	249	39	15.6	390

NOTE—In the year 1912 the first nine months only are given.

TABLE NO. V.—SHOWING DEATHS FROM SIX PREVENTABLE DISEASES DURING 1908–1909–1910–1911.

COUNTY.	Tuberculosis.				Diphtheria.				Scarlet Fever.				Typhoid Fever.				Measles.				Whooping Cough.			
	1908.	1909.	1910.	1911.	1908.	1909.	1910.	1911.	1908.	1909.	1910.	1911.	1908.	1909.	1910.	1911.	1908.	1909.	1910.	1911.	1908.	1909.	1910.	1911.
Beaverhead	1	3	6	1	1	4	3	....	4	....	3	3	3	....	2	....	....	....	....	....	....	....	....	....
Broadwater	....	1	1	....	1	....	....	1	....	4	4	....	....	....	....	....	....	....	....	....	....	....	....	....
Carbon	11	1	5	5	14	2	2	4	....	2	2	....	8	1	4	5	1	2	1	....	....	3	1	1
Cascade (Excl. of)	....	5	3	5	15	1	3	3	4	1	....	....	....	2	6	2	....	1	4	....	5	....	....	....
Great Falls	20	13	18	13	6	11	5	....	6	3	2	3	11	12	28	5	....	....	1	2	3	1	1	1
Chouteau	9	8	16	11	2	5	3	4	....	1	1	....	2	3	5	5	....	2	3	2	....	2	2	....
Custer	3	2	5	6	8	1	1	....	....	1	2	2	6	3	10	7	....	....	1	5	....	1	....	....
Dawson	6	5	5	4	2	7	4	3	2	1	....	1	4	3	....	5	....	....	....	1	....	....	....	1
Deer Lodge (Excl. of)	1	....	3	4	....	....	1	....	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....
Anaconda	11	13	1	5	6	2	8	3	3	....	2	....	1	1	1	....	....	....	....	....	....	....	....	5
Fergus	4	7	1	9	1	2	3	....	....	....	....	1	3	1	8	3	2	....	1	2	....	4	1	....
Flathead (Excl. of)	18	23	9	9	10	....	....	....	1	2	2	....	7	2	7	1	2	....	....	2	....	....	1	....
Kalispell	....	....	7	11	....	1	1	....	....	3	3	....	....	3	3	2	....	....	....	3	....	....	....	....
Gallatin (Excl. of)	2	5	3	10	1	1	1	....	1	1	....	2	1	3	3	4	....	....	....	3	....	1	....	....
Bozeman	5	4	1	5	1	....	....	....	1	3	....	....	....	1	2	....	....	....	....	....	....	....	....	....
Granite	2	1	4	3	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	....	....
Jefferson	5	3	3	3	5	1	1	....	....	....	....	....	....	....	2	2	....	....	....	1	....	....	....	....
Lewis & Clark (Excl. of)	....	1	6	....	2	....	....	....	....	2	1	1	....	1	1	1	....	....	....	....	....	1	1	....
Helena	28	19	17	20	7	1	1	....	3	2	2	4	2	7	6	3	....	....	....	4	....	....	1	1
Lincoln	....	....	1	2	....	1	....	....	....	1	....	....	....	1	....	....	....	....	....	....	....	....	2	....
Madison	2	5	7	1	....	2	2	1	3	1	1	1	2	1	....	1	....	....	....	5	....	4	1	....
Meagher	2	2	2	1	....	....	1	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....
Missoula (Excl. of)	5	1	5	22	11	2	1	....	3	1	1	1	6	....	1	2	....	....	....	1	2	....	....	....
Missoula City	18	20	14	14	8	1	....	....	1	1	....	....	29	7	13	4	....	....	....	....	2	....	2	3
Musselshell	....	....	....	2	....	....	....	....	....	....	....	1	....	....	....	1	....	....	....	....	....	....	....	....
Park (Excl. of)	3	4	7	2	1	....	1	....	....	....	1	....	1	2	1	1	....	....	....	....	....	....	....	....
Livingston	4	2	3	3	1	....	....	1	3	....	....	....	....	3	3	....	....	1	1	....	....	....	....	....
Powell	5	2	5	2	1	....	....	....	....	1	....	1	3	2	....	1	1	....	....	....	....	....	....	....
Ravalli	7	4	12	9	1	1	1	1	4	2	....	1	1	1	2	1	....	....	....	3	....	....	3	2
Rosebud	2	3	2	35	2	1	....	2	....	1	....	....	....	1	1	....	1	....	....	....	1	....	....	....
Sanders	1	1	....	3	3	....	....	....	....	1	....	....	1	....	....	....	1	1	1	....	....	....	....	....
Silver Bow (Excl. of)	39	40	16	49	11	9	6	1	12	2	4	3	7	3	3	....	....	....	....	1	....	7	2	2
Butte	73	90	93	96	14	14	5	2	28	16	19	7	11	11	10	8	....	....	1	1	....	9	8	3
Sweet Grass	5	6	3	1	....	1	1	....	....	3	....	....	2	....	1	....	....	....	....	....	....	....	....	....
Teton	....	....	1	14	....	1	....	....	....	1	1	....	....	1	3	2	....	2	2	1	....	....	....	1
Valley	7	6	10	32	2	2	....	2	....	....	....	....	2	5	9	3	1	....	....	1	....	1	1	1
Yellowstone (Excl. of)	2	3	6	2	4	1	1	1	1	5	5	....	2	3	....	3	6	....	....	....	....	1	....	3
Billings	11	11	9	13	8	8	5	1	....	....	1	1	8	10	12	8	2	....	....	....	....	1	....	2
Totals	315	320	343	420	119	83	61	30	80	63	57	33	128	97	147	80	17	9	16	52	13	36	33	26

Bacteriological Work.

Several years ago the State Board of Health made arrangements with Dr. Emil Starz of Helena to make bacteriological examinations for diphtheria, Tuberculosis and the necessary examinations for the diagnosis of typhoid fever.

Dr. Starz has made these examinations and the following table shows the number of examinations made during the years 1911 and 1912 for each disease. He not only made the examinations but supplied the culture media to the physicians which media is necessary in submitting the culture for examinations. These examinations resulted in the positive diagnosis of diphtheria, tuberculosis and typhoid fever and have undoubtedly saved lives by the prompt positive diagnosis of diphtheria alone, while in other instances it has resulted in the avoidance of quarantine measures in cases where the diagnosis is doubtful and yet in which without this bacteriological diagnosis it would have been necessary to have placed the patient in quarantine for a few days at least in order to have been sure that the disease was not a communicable one.

With a state laboratory devoted to Public Health work, the bacteriological examinations can be made in the same laboratory as is used for making the food and drug analysis. The character of the work performed by Dr. Starz needs no commendation to the people of Montana. His work is too well known to require comment.

BACTERIOLOGICAL EXAMINATIONS MADE DURING YEARS 1911–1912.

(By Emil Starz, Bacteriologist, Montana State Board of Health.)

COUNTY.	Tuberculosis.	Diphtheria.	Widal Reaction for Typhoid Fever.
Beaverhead	......	2	......
Broadwater	3	5	......
Carbon	9	10	......
Cascade	......	1	......
Chouteau	6	10	......
Custer	2	1	......
Dawson	2	15	......
Fergus	5	7	8
Flathead	1	.....	......
Gallatin	3	......	......
Jefferson	3	3	3
Lewis and Clark	52	51	30
Meagher	3	2	......
Missoula	......	2	......
Musselshell	......	1	......
Park	6	7	5
Ravalli	1	5	......
Sweet Grass	1	......	......
Teton	......	1	......
Valley	2	6	......
Yellowstone	2	6	......
Totals	101	135	46

Diphtheria examinations include those for release of quarantine. Besides the above examinations, numerous other bacteriological examinations were made (such as Actinomycosis, Glanders, Gonorrhoea, etc.).

(Signed EMIL STARZ.

Helena, Mont., Nov. 20, 1912.

Waters and Sewers.

In 1907 the State legislature passed a law providing for the protection of the water supply of this State and in that law there was a provision prohibiting the putting of sewage or other polluting matter into any stream or water supply in the State of Montana until such sewage or other polluting matter had been purified in a manner that would meet with the approval of the State Board of Health. This was a very strong law and the State Board of Health deemed it wise to give due and timely warning to the various cities, towns, etc., having sewer systems emptying into streams that purification plants must be provided.

After this notice was given the installation of such purification plants was postponed on one pretext or another until 1911, when the law was so amended that it required the State Board of Health to show that the sewage from a particular sewer system was a danger to the Public Health, before those responsible for such sewer systems could be required to install purification plants. In other words we must quietly wait until any sewage has caused a few or many deaths before we can even suggest that it is a danger to the Public Health, and then after these deaths have been caused, the State Board of Health is called upon to prove that all are directly the result of the particular sewage in question, a proof which it is practically impossible to present.

As an illustration, there had never been a large amount of typhoid fever in or about Gardiner up to August and September, 1912. During these two months quite a number of cases of this disease developed in and about Gardiner, in some three or four of the cases source of infection having been traced to the Gardiner river a short distance above the town of Gardiner. This outbreak of typhoid followed an unusually severe rain storm and was undoubtedly the result of pollution permitted to exist on the watershed of this stream above the town of Gardiner, and which was washed into the stream by the severe rain storm.

Now typhoid fever does not result immediately on introduction of the disease into the system. It requires some time after the poison has been taken before the effect is shown, and the source of the poison may be entirely removed before we known of its existence or before the disease appears in the system of the infected individual. This is well demonstrated in the outbreak of typhoid fever at Gardiner.

This outbreak was studied with a well qualified physician stationed at the Fort in the Yellowstone Park and he unqualifiedly agreed with the State Health Officer that the outbreak was due to the pollution of the water of the Gardiner river, that there could be no question as to this point. Samples of water taken from the Gardiner river the first week in September showed an absence of pollution in this stream. In other words the pollution that had been washed in by the unusual rain storm had been washed down stream and the State Board of Health could not possibly prove that the water sample is a source of infection.

Again the question of proving a water as a source of disease is very difficult, even when the water shows evidence of pollution. Imagine for instance, that we put a glass of milk into the Gardiner river at the Mammoth Hot Springs, then attempt to find globules of butter fat in a single drop of water taken from the river, yet these globules of butter are undoubtedly there and one drinking a glass of water may or may not get some of the globules into his system, but when a whole town drinks the water into which this glass of milk has been thrown, some of the people are almost certain to get some globules in their water, whereas a single drop put under a microscope for examination would not reveal it.

Another illustration of the inadvisability of requiring positive proof of pollution before action is taken to prevent pollution is furnished in a recent outbreak of typhoid fever in the town of Malta. For many years the water supply of this town has come from driven or bored wells, tapping an apparently abundant water supply found about twenty feet from the surface of the ground. During all of the time that this town has secured its water supply from the above mentioned source, they have maintained the common toilet or privy and yet there has been no evidence that there was any danger of polluting their water supply. I say, there had been no evidence of danger, and yet to those who understand and study the dangers incident to sewage pollution, the danger has existed from the time the first well was sunk and the first toilet constructed, but nature has not placed a red flag on the toilet and another on the well, even though the danger was there.

These conditions, as stated, have lasted for many years and no evil result came therefrom until the latter part of the present year when case after case of typhoid fever developed in the town of Malta. The first of these cases was taken as a matter of fact, and as there has always been more or less typhoid fever along the course of the Milk river, and always will be until the sources of infection along these banks are eradicated, but as the cases increased in the town of Malta, the people began to wake up and wanted to know the source of the unusual number of cases of typhoid fever in their town. Analyses of the water of the various wells immediately showed a very marked pollution in their water supply, this pollution undoubtedly coming from water closets which thickly studded the ground in all directions. I counted nineteen toilets along the alley in a single short block. These toilets had existed for years and Nature had done her best to take care of the pollution added to the ground by them, but the day came, as it must always come, for such conditions when the earth can no longer hold this pollution from its deeper strata and it finally reached the water bearing strata of the soil and the result was the immediate pollution of the water supply and suffering and death resulting therefrom.

In Pennsylvania they have had a sewage pollution law similar to that passed by our Legislature in 1907 for five years. Their State Board of Health does not have to prove pollution. If they believe that a sewage system is a source of infection they have the power to immediately require the installation of a purification plant and there is no appeal from the decision of this board. What is the result? As reported by the Board of Health of Pennsylvania at the meeting of the American Public Health Association in 1912, there had been up to the end of 1911 a reduction of 65 per cent in the number of typhoid fever cases occurring in that State, as compared to the conditions before the sewage pollution law went into effect. And not only this, but the Health Officer stated that from the number of cases reported up to that time in 1912, unless they had some very severe outbreaks it was evident that the reduction would reach 75 per cent for the current year.

Montana has absolute control of her water supply. Nearly all of the water originates within our State or within the boundaries of the Yellowstone Park. We find the Federal Government ready and willing to protect the waters rising in the Park if our State will protect them after leaving the Park, but we cannot ask the Federal Government to place a sewage purification plant at the fort in the Yellowstone Park in order to protect the water of the Gardiner river, while eight miles below there we permit Gardiner to empty her sewage into the river and eight miles further down we permit a health resort to empty her sewage into the river and a few miles further grant the same privilege to Livingston, then Hunter's Hot Springs, Big Timber, Billings, Laurel, Huntley, etc., nor can the State Board of Health be expected to perform the impossible, namely, to prove to a lay jury a point that is not susceptible to proof in terms that they could understand.

Therefore if the waters of our State are to be protected they must be protected by arbitrary requirements and these requirements must be in the form of laws passed by our Legislature.

Rocky Mountain Spotted (Tick) Fever.

The study of Rocky Mountain Spotted (Tick) fever is one of interest to every individual in the State of Montana. It is not only of interest to the people of Montana but it is of interest to the people of all the Northwestern States, and I may say all of the Rocky Mountain States, because this disease is not confined to Montana, but is known in practically all of the Rocky Mountain and Pacific Coast States. (See the accompanying reports by Drs. Rucker and McClintic.)

It is commonly stated that this disease is extremely fatal in Montana, while in other States it is not fatal or rather that it is very slightly fatal. This staement should be modified to the extent that the disease has proven very fatal in the western portion of the Bitter Root Valley. I hold that this modification of the above statement is indicated because of the fact that the disease is known in other portions of the State. For instance, it is known to occur in the southern portion of Carbon county, where it assumes the mild form found in Wyoming, Idaho and other Rocky Mountain States.

During the summer of 1912 two cases of this disease were reported to the State Board of Health from Fergus County, but we have reason to question the diagnosis in these two cases, as they occurred in a neighborhood where measles was prevalent when the diagnosis was made, and it is not uncommon to mistake a mild form of Spotted tick fever for a severe case of measles and vice versa. Again, a death was reported from Beaverhead County in October of 1912 as being due to Rocky Mountain Spotted (tick) fever, but on corresponding with the physician who had charge of this case this office was supplied with a detailed account of the symptoms and the history of the case and it was our belief that the death was due to spotted fever of epidemic cerebrospinal meningitis and not to Rocky Mountain Spotted (tick) fever, these two diseases being entirely different.

The last Legislature appropriated $5,000.00 for the year 1911 and $5,000.00 for the year 1912, to be expended by the State Board of Health in employing experts to carry on the investigation into the cause of this disease and the means by which it may be eradicated, a work that was cut short by the untimely death of Dr. Howard T. Ricketts.

The Secretary of this Board made every effort to find a competent expert who would be willing to take up the study of this disease at the expense of the State, his salary to be paid from the money appropriated by the Legislature. To many of our Legislators it may seem absurd that an offer of $3,000.00 salary per year did not induce experts to take up this work. The study of such a disease is a dangerous proposition and to those who realize the dangers of this work it is no cause for surprise that we did not have a rush of applicants to earn the $3,000.00 salary offered. After making an effort to secure a man to devote his time to this work and failing to find one, we appealed to the United States Public Health Service for assistance in the matter, from which appeal we were supported by the United States Senators from our State. This appeal resulted in Drs. Thomas B McClintic and William C. Rucker being sent to Montana in May of 1911, the salaries of these two men being paid by the Federal Government and the expenses involved in the work in the field being paid by the money appropriated by the State for this purpose.

These men took up their work at Victor and attempted to eradicate the ticks from the small area in which it has existed so long as we have known anything about the disease. This area covered eight square miles and the work consisted in attempting to starve out the ticks in this district. To this end the small animals, that group of animals commonly known as gophers, but in fact including ground squirrels and other burrowing rodents, were killed by trapping, poisoning and shooting and all domestic animals upon which ticks were known to feed were dipped repeatedly in a fluid poisonous to the ticks. At the same time these gentlemen carried on a scientific study of the disease, endeavoring to find the particular animal that bears the tick in nature.

The result of the work in 1911 is set forth in the following report made by Dr. McClintic.

In March, 1912, Dr. McClintic returned to the field bringing with him a lovely young lady who had just become his bride. The doctor continued his work in a most energetic manner and the result of this work is evident from the fact that 1912 is the first year in the history of Rocky Mountain Spotted (tick) fever that one or more cases have not come from the eight-mile area in which this work was done. Unfortunately we cannot have a report of the work done by Dr. McClintic in 1912 because like Dr. Howard T. Ricketts, Dr. Thomas B. McClintic sacrificed his life to the scientific study of this disease.

Dr. Rucker's report, which we submit herewith, sets forth a review of the work, but he does not in any way attempt to show the results of Dr. McClintic's work for 1912. It is impossible for anyone to set forth work done by Dr. McClintic because no original investigator can make a report for another. What Dr. McClintic's report would have contained we are entirely unable to say, but from the talks our Secretary had with him just before he was taken sick, we feel confident that his report would have very strongly indicated that the common ground squirrel has much to do with keeping up this disease in any locality.

The common ground squirrel is very susceptible to Rocky Mountain Spotted (tick) fever, but the disease does not make the squirrel ill and rarely, if ever, results in death, but a tick taken from a squirrel infected with this disease will promptly transmit the disease to a guinea pig and cause a severe form to appear in such guinea pig. The only way to determine whether a squirrel has had spotted (tick) fever or not is by what is known as the immunity test, that is, if the squirrel has had spotted fever you cannot cause him to have it again. Dr. McClintic tested a large number of squirrels, collecting them from various localities, and he found that among the squirrels collected from the infected area, a large percentage of them were immune. In other words they had had spotted (tick) fever.

Squirrels collected on the west side of the Bitter Root river, but outside of what is known as the infected area showed very small percentage to have had the disease, while among the squirrels collected from the east side of the river it is our understanding that none of them were found to be immune. This would point strongly to the squirrel as a carrier of the disease and therefore make it more important that the fight be continued more energetically against these burrowing rodents, not only as a means of starving the tick which transmits the disease to man, but as a possible means of eradicating the harbinger of this disease.

In a talk with Senator Groff and the Secretary of the Board of Health Dr. McClintic stated that his report would advise the continuance of the fight against the tick and the small animals of the infected locality and that this fight be extended over the entire area involved in the disease. However as this disease is one that prevails in many of the Western States and it is liable from time to time to extend to a new area, the problem is an interstate problem, and we therefore urge that the Legislature not only provide money to assist in eradicating the disease from our State, but that it memorialize Congress and urge them to make a liberal appropriation to the United States Public Health Service in order that they may carry on this work over a large area with the hope of not only preventing its spread, but eradicating it from the country.

Before submitting the reports of Drs. Rucker and McClintic let me especially call the attention of the Legislature to what this study has cost, not to what it has cost in dollars and cents, but to what it has cost the world.

In 1909 the Legislature appropriated money to defray the expenses incurred by Dr. Howard T. Ricketts in the study of Rocky Mountain Spotted (tick) fever. Dr. Ricketts had been studying this disease the previous two years and it had been suggested, in fact urged by many, that the disease known in this country as Rocky Mountain Spotted (tick) fever was the same as that known in Mexico as Mexican Typhus fever. Therefore in the early part of 1910 Dr. Ricketts went to Mexico to study the disease there and while making this study he became infected and died from the disease, having become infected just a few days before he would have left for Montana to take up the study again for our State.

Dr. Ricketts is known and recognized by all as one of the brightest men of our age. His work is considered as a standard today and though a young man he was to have taken the chair of Professor of Pathology in one of the leading medical schools in our country, namely the University of Pennsylvania, in the fall of the year in which he died.

But not satisfied with taking the life of this brilliant student of research work when he was apparently just on the verge of discovering its hidden source in Nature, Rocky Mountain Spotted (tick) fever reserved its venom to strike another of our most promising of students in this field, Dr. Thomas B.

McClintic. He had almost finished his field work for 1912 and was to have left the field on Sunday, August 11th. On Wednesday, August the 7th, he began to feel ill, but we hoped he had not been stricken with this dread disease and at his requested started him to Washington accompanied by a physician. However, on Sunday, August the 11th, the disease showed plain evidence of its being the one we hoped to avoid, and on Tuesday, August the 13th, Dr. McClintic's life was added to the sacrifice made three years before by Dr. Ricketts. These two brilliant men have given their lives in the study of a disease that has destroyed the lives of many of our fellow citizens.

In the halls of our State House we find bronze tablets erected to the memory of those who died in battle and though Dr. Rickett's death occurred a year before our last Legislature was in session, not even one word of sympathy was expressed by that body for the man who had thus given his life. Is it not therefore becoming that this Legislature at least make note of these two lives that have ben sacrificed in a silent battle against disease, a battle in which the combatants realize their danger as thoroughly as do the soldiers in battle realize the danger there, a battle in which the combatants fight quietly, uncheered by martial music and void of the encouraging cheer of their comrades in arms. That these men fully realize their danger witness the statement made by Dr. McClintic to Surgeon General Wyman in 1911 before he came to Montana, viz: "There ought always to be two men at work on a subject like this, because we never know what will happen," and what he evidently dreaded did happen to him in 1912, and because there was only one man in the field his work for that year is lost to the world."

TREASURY DEPARTMENT
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INVESTIGATIONS OF AND TICK ERADICATION IN ROCKY MOUNTAIN SPOTTED FEVER

A Report of Work Done on Spotted Fever in
Cooperation With the State Board
of Health of Montana

BY

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INVESTIGATIONS OF AND TICK ERADICATION IN ROCKY MOUNTAIN SPOTTED FEVER*

A Report of Work Done on Spotted Fever in Co-operation With the State Board of Health of Montana.

By Thomas B. McClintic, Passed Assistant Surgeon Public Health and Marine-Hospital Service.

INTRODUCTION.

Rocky Mountain Spotted Fever has prevailed in Montana and Idaho for at least several decades. The earliest available record of the disease having been reported was in the year 1873. Cases of the disease have from time to time occurred in other States until now Rocky Mountain spotted fever has been reported from practically all of the Rocky Mountain States, including Arizona, California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, Washington and Wyoming.

Although the disease is far more prevalent in Montana and Idaho than in any of the other States, its spread has assumed such proportions in the last decade as to call for the gravest consideration on the part of both the State and national health authorities. In fact, the disease has so spread from State to State that it has undoubtedly become a very serious interstate problem demanding the institution of measures for its control and suppression. There is, however, a marked variation in the severity of the disease in different localities, notably in Montana, as compared with Idaho. Particularly in the Bitter Root Valley in Montana the mortality rate is very high, while in Idaho it is comparatively low.

The reason for this variation in severity still remains an unsolved problem. On account of its persistent seasonal prevalence and severity the disease has become a very serious public health and economic problem in the Bitter Root Valley, where, in addition to the lives that are annually sacrificed, very valuable agricultural lands have depreciated in value and in certain localities have been almost abandoned on account of the fear and dread that the inhabitants have of Rocky Mountain. spotted fever.

For several years the State Board of Health of Montana has been carrying on a campaign of investigation with the purpose in view of eradicating, if possible, the disease from that State. It has had the services of such workers as Wilson and Chowning of the University of Minnesota; Ashburn, Craig and Keifer of the Army; Cobb, Anderson, Stiles, Francis and King of the Public Health and Marine-Hospital Service; and, finally, Ricketts and his associates.

The State Legislature of Montana early in 1911 made an appropriation for continuing the work for a period of two years, and at the request of the State Board of Health, through its secretary, Dr. T. D. Tuttle, the work was again taken up by the Public Health and Marine-Hospital Service in May, 1911. It at once became evident that the rational lines along which the work should be carried were in accordance with those laid down by Dr. H. T. Ricketts. While the appropriation available was not large enough to allow the taking up of the work on an extensive scale, nevertheless it was apparently sufficient, exclusive of the officers' salaries which were paid by the Treasury Department, for determining or making a demonstration as to the feasibility of eradicating the tick, **Dermacentor andersoni** Stiles, the real causative agent concerned in the transmission of Rocky Mountain spotted fever. It was therefore decided to select a limited area in one of the worst infected territories and to put into operation the best-known measures for the eradication of the tick. It was also considered advisable to continue Rickett's work of testing the susceptibility of the wild mammals to experimental inoculation with spotted fever and to search for the infection of that disease among the wild mammals in nature.

Accompanied by Dr. Tuttle, I arrived in the Bitter Root Valley the latter part of May, and after looking over the situation in the valley it was decided to carry on the work in the vicinity of Victor, Mont. An infected territory of about 8 square miles was selected about 3 miles from Victor. It is situated in the foot hills of the mountains on the west side of the valley and has its boundaries rather well defined on the north and south by Sweathouse Creek and Bear Creek, respectively. In this territory the ticks are found in large numbers during the tick season, and many cases of spotted fever have been reported from there during past years; in fact this territory has been almost depopulated because of the presence of spotted fever. From this district Ricketts, during the season of 1908, collected ticks with which he was able to infect guinea pigs.

As most of the cases of spotted fever occur in the Bitter Root Valley during the months of April and May it will be seen that the latter part of May was very late in the season to begin the work. It was decided, however, that a start should be made and that the work could again be taken up at the beginning of the tick season of the next year. The ticks begin to decrease in number during the month of June, and by the first of July they have largely disappeared. Throughout most of the year it is, however, possible to find, from time to time, a few ticks in certain localities.

The work was carried on at Victor until August 7, when it was transferred to the Hygienic Laboratory at Washington, where the laboratory side of the work was continued.

About the middle of June, Passed Asst. Surg. W. C. Rucker was detailed to assist in the work.

As the State of Montana made the appropriation for conducting this investigation, the work is being done in conjunction with the State Board of Health. Dr. T. D. Tuttle, secretary of the board, has heartily co-operated in every way possible and in an advisory capacity has rendered valuable service in outlining the work and in furthering its success.

The studies of Dr. Ricketts on Spotted Fever have been of the greatest value, and it has been endeavored to take up the work where he left off and to continue it by putting into effect his plans and recommendations.

The work as contemplated, and as carried on, may be embraced under two general headings as follows:

1. The eradication of the tick.
2. Laboratory investigations.

ERADICATION OF THE TICK.

Ricketts and others having fully established the important role played by the tick, **Dermacentor andersoni,** in transmission of Rocky Mountain spotted fever, it is at once evident that measures for the suppression and prevention of the disease must necessarily be directed along the line of the eradication of the tick.

As the seasonal prevalence of the tick is largely limited to the months of March, April, May and June, that season is usually known as the "tick season" in the Bitter Root Valley. During the remainder of the year the tick is found only sparingly and the occurrence of cases of spotted fever is consequently rare during this time. On the other hand, during the tick season, particularly in April and May, the tick is found in large numbers, and considering the general topography of the valley and bearing in mind that the disease is found from the foothills to the top of the mountains, it will be seen that its complete eradication from the Bitter Root Valley is an impossible undertaking. The valley is about 100 miles long and is formed by two ranges of the Rocky Mountains that in places reach an altitude of eight to nine thousand feet. The ranges bounding the valley are intersected at intervals by deep gorges or canyons and the mountains in places are very precipitous and almost impassable. While the valley narrows down to a deep gorge toward its southern extremity, throughout most of its length it varies in width from a few miles to about 25 miles.

The tick is seldom found on the cultivated lands of the valley, but is largely restricted to the forested foothills and mountains. Both in point of numbers and variety of species the fauna of the valley is excelled by very few other localities of similar size in the United States, and most of the mammals, both wild and domestic, harbor the tick in one form or another. It is therefore evident that the dipping of the domestic stock alone will not eradicate the tick from the valley completely. There is no doubt, however, that it will greatly reduce the number of ticks, and in consequence will both minimize the chances of inhabitants becoming infested with ticks and of ticks being carried to the vicinity of, or into, dwellings by persons or domestic animals.

The measures put into force for the eradication of the tick in the infected territory selected for demonstrative purposes were as follows:

A. Dipping of the domestic animals known to harbor the ticks.

B. Killing of the wild mammals.

Dipping of Domestic Stock.

An area of about 8 square miles conveniently located in the infected territory was selected. In this area a dipping vat was constructed. The vat was made of concrete according to the plans given in Farmers' Bulletin no 378*. It has a depth of 9 feet and is about 38 feet long at the water line. When using the vat it is filled with dipping fluid to a depth of 5 feet 5 inches. With this depth of fluid, all of the stock, with the possible exception of a few large horses, are completely immersed upon going down over the slide. The slide was first constructed of concrete, but as it did not become smooth, a boiler-metal slide was later installed. The cost of construction of the vat, including corrals, dripping pens, etc., was about $520. The dipping fluid used is an arsenic preparation, recommended by the Bureau of Animal Industry, Department of Agriculture, and sold under the name of "Tixol." It is used diluted with water to a strength of 1 per cent. The quantity of liquid required to fill the vat to a depth of 5 feet 5 inches is about 2,500 gallons. The construction of the vat was completed June 14 and the dipping of domestic stock begun at once.

The following stock was then dipped:

Horses	116
Cattle	199
Sheep	108

After an interval of about two weeks, on July 3 the redipping of the stock was begun, but as the stock, upon examination, was found to be practically free from ticks the dipping was discontinued after the following stock had been redipped:

Horses	38
Cattle	57
Sheep	60

There were no untoward results following the dipping of the stock in the arsenic dipping fluid, except that one young bullock later showed a marked peeling of the skin. I was informed by the State veterinarian, Dr. Knowles, that this was not a result of the animal having been dipped. The animals were driven to the vat and allowed to remain in the corrals for a half hour or more before they were dipped. After they were dipped they were kept in the corrals until they became dry. It was found necessary to employ the services of a competent man to bring the stock to the vat when the owners were too busy to do so. This will frequently be found to be the case, particularly during the farmer's busy season. Furthermore, considerable difficulty is sometimes encountered in corralling and driving the stock into the vat and consequently the services of a man familiar with the handling of stock are necessary in this capacity. Most of the stock owners are willing to have their stock dipped, but a few, as is usually the case in undertakings in the interest of the public health, object to having anything done that causes any inconvenience or work. In this case their objection is usually based on the argument that their stock does not need dipping, or that they do not believe in the tick as a transmitter of spotted fever. To obviate this difficulty a State law should be passed compelling all persons to have their stock dipped in the interest of the public health.

Killing of Wild Mammals.

It is already known that some of the wild mammals found in the Bitter Rooter Valley are susceptible to experimental inoculation with spotted fever, while the question as to the susceptibility of the others has not yet been determined. It is also a fact that many of the wild mammals found there harbor the tick in one form or another, so that the killing of these animals serves a twofold purpose.

The ground squirrel **(Citellus columbianus)**, commonly known as the "gopher" or "picket-pin," is the predominating animal found in the Valley. This animal is susceptible to experimental infection with spotted fever and is often found harboring the larval and nymphal forms of the tick in large numbers. Its seasonal prevalence coincides rather closely with that of the tick. It goes into hibernation about the first of August, while the tick has largely disappeared by the first of July.

The campaign of destruction of the wild mammals was waged principally against the ground squirrel (**Cittellus columbianus**), the pine squirrel **(Sciurus hudsonicus richardsoni)**, the yellow-bellied chipmunk **(Eutamias b. luteiventris)**, the wood rab **(Neotoma cineria)**, the woodchuck **(Marmota flaviventor)**, the weasel **(Putorius arizonensis)**, and the badger **(Taxidea taxus)**.

The methods of killing these animals consisted of shooting, trapping, poisoning, and the use of carbon bisulphide placed in the burrows of the animals. A force of from three to five men was employed in carrying on this work of animal extermination. About 100 to 150 small traps were used. These were set in the burrows of the animals. After the traps had been set for a while and most of the animals caught, the traps were then moved to other burrows and poison (poisoned wheat) placed in the burrows from which the traps were removed. Only 25 gallons of carbon bisulphide were used, but it proved very efficient in killing all mammals that live in burrows. It was used by simply saturating a ball of waste or other material with the liquid and then placing it in the burrow of the animals, after which the mouth of the burrow was closed with a piece of sod or some earth. After all the communicating burrows have thus been treated and closed the carbon bisulphide gas can be exploded, if so desired, by touching a match to one of the burrows in which the carbon bisulphide has been placed. it appeared, however, that its efficiency was increased by not exploding the charge, the gas itself being deadly to animal life.

The work of killing wild mammals was begun June 7 and discontinued August 5, during which time the following animals were either shot or trapped in the district selected for carrying on the work:

Ground squirrels (C. columbianus)	3,233
Pine squirrels (Sciurus h. richardsoni)	109
Chipmunks (Eutamias b. luteiventris)	94
Wood rats (Neotoma cineria)	7
Woodchucks (Marmota flaviventor)	1
Weasels (Putorius arizonensis)	16
Badgers (Taxidea taxus)	5
Total	3,465

The above does not of course include the animals killed with poison or carbon bisulphide, it being impracticable to determine the number killed by either of these processes.

The following table shows, by weeks, the number of ground squirrels killed by shooting and trapping during the season:

Week ended—	Number of squirrels.	Week ended—	Number of squirrels.
June 10	275	July 15	450
June 17	584	July 22	371
June 24	401	July 31	196
July 1	454	Aug. 5	83
July 8	419		

A glance at the above table will show how the ground squirrels began to disappear about the middle of July and that by the 1st of August most of them have gone into hibernation.

Unfortunately in waging a campaign of extermination of ground squirrels by shooting and trapping the operator is very much at the mercy of the weather, as the squirrels are not inclined to come out of their burrows during inclement or bad weather. Therefore, for purposes of extermination in the future, it is proposed to rely principally upon the use of poison and carbon bisulphide, particularly the latter. During the early season in the Bitter Root Valley, poison and carbon bisulphide can be used, however, to much better advantage for killing mammals that live in burrows than they can later in the season after the green vegetation appears. Naturally, after the vegetation comes out food becomes plentiful, and the animals are not inclined to take the poisoned grain as readily as they do early in the season when food is scarce. Furthermore, after the dense grass, etc., has appeared it is difficult to find all the burrow openings when using carbon bisulphide.

OTHER METHODS THAT MAY BE UTILIZED IN ERADICATING THE TICK.

Hand Treatment of Domestic Stock Infested With Ticks.

This should be permissible only in case the use of the dipping vat is not available or under certain circumstances where there are only a small number of gentle stock to be treated, such as, say, a horse and a cow or two. In that case the stock should be carefully searched for ticks every three or four days, or an arsenical dip may be applied by means of a spray, cloth, or otherwise, at least once every 7 days. The principal difficulty in using a dipping fluid by hand is that the ticks are usually found on the under surfaces of the animals where it is more or less difficult to efficiently apply the dipping fluid by hand methods.

Burning.

There is no doubt that a great many ticks are destroyed by the forest fires that sometimes sweep over the mountains of the Bitter Root Valley. It is largely the immature forms or "seed ticks" that are destroyed, as the fires usually occur in the fall of the year, when it is supposed that most of the ticks are in the transition stage. The forest fires also consume a great deal of debris and undergrowth in which the ticks apparently find conditions most favorable for their protection and life preservation. A great deal could therefore be accomplished in tick eradication by a systematic burning of the mountains every autumn. The practicability of putting such means into effect, however, will have to be left to the opinion and judgment of experts on forest fires. Most of the mountainous land in the Bitter Root Valley belongs to the Forest Reserve, the care of which is under the jurisdiction of the Bureau of Forestry. Forest fires are often hard to control and sometimes cause loss of life. They also destroy a certain amount of valuable timber, but provided the fires can be kept under control the loss through the destruction of timber in the Bitter Root Valley will be small as compared with the loss of life from spotted fever and the depreciation in value of the agricultural lands on account of the presence of that disease. Burning over the foothills early in the spring of the year after the snow melts would destroy a great many ticks and would not endanger property, as the fire then burns slowly and could be controlled. The snow in the mountains would prevent the fire from extending there. The burning, however, should be carried on under the supervision of experts from the Bureau of Forestry, who are familiar with the management and control of forest fires.

Clearing.

There is a large quantity of tillable land on the west side of the Bitter Root Valley that is not under cultivation. Some of it is still covered with virgin forest, while a portion of it is covered with dense shrubbery and undergrowth. It is on land of this character that the tick is found in greatest numbers, the vegetation seeming to afford it protection. The tick is seldom found on land under ctulivation; consequently the clearing and cultivation of the land referred to would practically eradicate the tick therefrom. Of course the clearing of this land should not be attempted during the tick season, but during the other portion of the year when the danger of infection by the tick would be reduced to a minimum.

LABORATORY INVESTIGATIONS.

A Study of the Susceptibility of Certain Mammals to Experimental Infection with Rocky Mountain Spotted Fever.

Ricketts worked on the susceptibility of some of the wild mammals in the Bitter Root Valley to infection with spotted fever and proved conclusively that at least several of the species found there are susceptible to experimental infection with that disease. By inoculation with the virus of spotted fever (i e., blood from an animal, usually the guinea pig, sick with the disease, about the third day of the animal's fever) he was able to infect the ground squirrel, woodchuck, rock squirrel, chipmunk, and mountain rat. With the exception of the mountain rat, he was successful in infecting those animals by the bites of infected ticks, and completed the "tick cycle" in the case of the ground squirrel, woodchuck, rock squirrel and probably the chipmunk. He used the term "tick cycle" to indicate the infection of an animal by the bite of an infected tick and then the infecting of a fresh tick from the animal so infected.

Although some of the wild mammals in the Bitter Root Valley are known to be susceptible to infection with spotted fever, when they are inoculated with the virus they usually have the disease in such mild form that it is almost unrecognizable from the symptoms produced. Therefore, practically the only reliable method of diagnosing the infection in the mammals referred to consists in the inoculation of blood from the suspected animal into a highly susceptible animal such as the guinea pig, and noting the results in the latter animal.

The role, if any, that the wild mammals play in the existence of the infection from year to year or in the spread of the disease has not yet been determined, as the disease has never been found in any of the wild mammals in nature. Practically no pathological lesions are found on post-mortem examination of these animals, even when they are known to be infected with spotted fever.

For the purpose of determining whether or not spotted fever prevails among the wild mammals in nature, it appears that about the only way in which the problem can be approached is through (a) a search for the infection in mammals from infected districts by inoculating their blood into guinea pigs, and (b) a study of the immunity and susceptibility of mammals from infected districts as determined by inoculating them with the virus of that disease and later making inoculations of their blood into guinea pigs. In the latter case it is assumed, since it has been fairly well established, that an attack of spotted fever in a susceptible animal renders the animal immune to further infection with the disease. For instance, a ground squirrel is susceptible to infection with spotted fever, either by the bites of infected ticks or by inoculation, but it would not be found susceptible to further infection with that disease provided it had already had the disease in nature. The work was undertaken along the lines indicated above. Some work was also done on the neutralizing powers of the blood of some of the wild mammals as determined by mixing it with the virus of spotted fever and injecting the mixture into the guinea pigs. Success in this field, however, is handicapped by the fact that even though an animal has had spotted fever and been thus rendered immune the antibodies produced in the blood of the animal do not remain there indefinitely.

The Ground Squirrel (C. Columbianus).

The ground squirrels used in this work were captured by the force of men employed in carrying on the campaign of wild mammal extermination in the territory selected for demonstrative purposes. The ground squirrels, therefore, came from a district supposed to be badly infected with spotted fever. As most of the animals were caught in traps they were all more or less injured about the feet and legs. This, of course, was of no consequence, provided the animal's blood was simply to be taken and injected into guinea pigs, but when the squirrels were to be injected with the virus of spotted fever it was necessary to keep them until they had recovered from their injuries before they were inoculated.

Search for the Infection of Spotted Fever Among the Ground Squirrels in Nature.—The men carrying on the campaign of wild mammal extermination were furnished with clinical thermometers and directed to take the temperature of all live ground squirrels at the time they were captured. They were also instructed to examine the animals closely for abnormal appearances or conditions and to forward all suspects to the laboratory. Unfortunately, the temperature of the ground squirrel does not furnish a reliable index as to whether or not it is infected with spotted fever. It was found that a ground squirrel, after being trapped and left in the hot sunshine for awhile, might show a temperature of 110 degrees Fahrenheit, which, when the animal was removed to the shade, might drop as much as 10 degrees in the course of an hour. Under these conditions the temperature of ground squirrels was found to vary from 95 to 110 degrees Fahrenheit.

Ricketts had observed this variability in the temperature of both the healthy and infected ground squirrel, and in order to determine whether or not a ground squirrel was infected with spotted fever after it had been inoculated with the virus of that disease, he found it necessary to make an inoculation of the blood from the squirrel into a guinea pig. In the absence of either ante-mortem or post-mortem lesions or evidences characteristic of spotted fever in the ground squirrel this is apparently the only method that offers any hope of success in finding the infection among them in nature. As the ground squirrels used for this purpose have to be selected more or less at random, the work naturally will have to be taken up and done on a large scale before any definite conclusions can be arrived at. This, of course, necessitates the use of a large number of guinea pigs, which are obtained with difficulty in Montana.

It was impossible to carry the work on to any extent during the season of 1911. Blood from only 21 ground squirrels was injected into a corresponding number of guinea pigs. The ground squirrels were selected on account of their harboring a large number of ticks, or their having an extremely high or low temperature, or their showing some condition that seemed abnormal.

The quantity of ground-squirrel blood that was injected into the guinea pigs varied from 2 c. c. in some cases to 4 c. c. in others. The blood was usually taken from the heart of the ground squirrel and injected intraperitoneally with 2 c. c. of normal saline solution. The temperatures of the guinea pigs were then taken every day for about two weeks. None of the pigs injected from the 21 squirrels showed any evidence of spotted fever, although they all developed it when later they were given an immunity test with the virus of that disease. This work thus proved negative so far as finding the infection in ground squirrels is concerned.

The Susceptibility of the Ground Squirrel to Spotted Fever Infection.—The ground squirrels were caught and kept in captivity until they had recovered from the injuries caused by the traps. They were then inoculated intraperitoneally with the virus of spotted fever. Their temperatures were taken each day, and at the end of definite periods inoculations of their blood were made intraperitoneally into guinea pigs. The blood for this purpose was usually taken from the heart of the squirrel by means of a syringe. Many of the squirrels died as a result of the heart puncture. No lesions characteristic of spotted fever could be found on any of them on post-mortem examination, although the injection of their blood into guinea pigs usually produced spotted fever in the pigs. The same irregularity in the temperature range of the ground squirrels was observed after they were inoculated with the virus of spotted fever. as was observed in them before they were inoculated, usually ranging from 100 to 104 degrees Fahrenheit.

The following table shows the results of inoculating guinea pigs with blood of ground squirrels which had previously been inoculated with the virus of spotted fever:

No. of Squirrel.	Amount of Virus Inoculated.	Duration from Date of Inoculation.	Blood from Squirrel to Pig.	Number of Guinea Pig.	Result in Guinea Pigs.
	c.c.	Days.	c.c.		
26	1.0	7	2.0	75	Positive (1). died.
27	1.0	5	2.5	118	Do.
28	1.0	5	1.5	119	Do. (1)
29	1.0	5	1.0	120	Do.
30	1.0	5	1.0	121	Do.
31	1.0	5	1.5	122	Do.
32	1.0	5	1.0	123	Do.
33	1.0	5	1.0	124	Do.
34	1.0	5	1.0	125	Do.
35	1.0	5	1.5	126	Positive, moribund. killed.
36	1.0	5	1.0	127	Do.
37	1.0	5	1.0	128	Positive. died.
38	1.0	5	1.5	129	Do.
51	1.0	5	.5	155	Positive. moribund. killed.
52	.5	5	.5	156	Do.
53	.5	2	.5	149	Negative (2).
54	1.0	5	.75	157	Positive, died.
55	.5	5	.75	158	Questionable. (3).
57	1.0	5	.75	159	Positive, moribund. killed.
65	.5	6	.5	299	Positive. died.
66	.5	12	.5	306	Negative.
		6	.5	300	Positive, died.
		12	.5	307	Positive, recovered.
67	.5	6	.5	301	Positive, died.
68	.5	6	.5	302	Do.
69	.5	6	.5	303	Positive, recovered.
70	.5	12	.5	308	Negative.
		5	.5	388	Positive, died.

(1) Positive, means that the guinea pig ran the temperature and showed the lesions that are considered typical of spotted fever.

(2) Negative, means that the guinea pig did not have spotted fever as proven later when it was given the immunity test.

(3) Questionable, means that there was doubt as to whether or not the guinea pig had spotted fever.

That the blood taken from ground squirrel No. 53 on the second day after its inoculation with the virus did not infect the guinea pig, as was proven later when the guinea pig was given the immunity test, is not positive proof that the ground squirrel was immune to spotted fever. Non-immune guinea pigs do not invariably develop the disease when they are injected with the virus, but the negative result in question is probably due to the early date in the period of incubation at which the blood was taken from the ground squirrel.

The result with ground squirrel No. 55 is in doubt, since the guinea pig did not run the temperature or show signs typical of spotted fever either following its injection with blood of the ground squirrel or later when it was given the immunity test. It is probable, however, that it had a mild attack of spotted fever and was thus rendered immune as a result of its injection with the blood of the ground squirrel.

Blood taken on the sixth day from ground squirrels Nos 65, 66 and 69 was infective for guinea pigs, but it was not infective for them at the end of 12 days except in the case of ground squirrel No. 66. These results are in rather close accord with Rickett's findings, namely, that the blood of ground squirrels experimentally infected with spotted fever is not usually infectious for guinea pigs after the twelfth to the fifteenth day. It will be observed that nearly all of the ground squirrels tested were definitely proven to be susceptible to experimental infection with spotted fever as shown by the results in guinea pigs. This is rather contrary to expectations, in view of the fact that all of the ground squirrels came from a district supposed to be badly infected with spotted fever, and since that animal is known to be susceptible to infection through the bite of the infected tick.

As more or less of a control for the work along this line two experiments were done with ground squirrels that had recovered from spotted fever. Ground squirrels Nos. 27 and 31 were experimentally infected with spotted fever as is shown above. About seven months after they were thus infected they were again inoculated with the virus and five days later inoculations of their blood were made into guinea pigs Nos. 384 and 385, respectively. Both of the guinea pigs remained well until they were given the immunity test a month later from which they both developed spotted fever. These results thus indicate that these two ground squirrels were immune to spotted fever after a lapse of seven months.

Further work during the next season on the immunity of ground squirrels from other infected districts is contemplated.

The Protective or Neutralizing Properties of the Blood of Immune Ground Squirrels.—Ricketts having found that the blood of the ground squirrel recently recovered from spotted fever has rather marked neutralizing powers when mixed with the virus of that disease and injected into guinea pigs, some work was done along this line with blood from 30 ground squirrels that were caught in the infected district. The blood was defibrinated and quantities varying from 0.5 c. c. to 2 c. c. were mixed with 0.5 c. c. or 1 c. c. of virus of spotted fever. After mixing the blood and virus it was immediately injected into guinea pigs. A total of 35 guinea pigs were thus utilized, 2 of them being used in each case of 5 ground squirrels. The results will not be given in tabular form, as the blood from the ground squirrels did not apparently protect any of the guinea pigs in the least against infection with spotted fever. Of the 35 guinea pigs thus utilized 27 died of spotted fever,. while the remainder had well-marked cases of that disease but recovered.

In connection with this work some experiments were done with the blood of three ground squirrels which, 100 days previously, had been immunized against spotted fever; that is, their infection with that disease was proven. They were ground squirrels Nos. 34, 37 and 38 (see pa —).

The following table will show the results of mixing the blood of the ground squirrels with the virus of spotted fever and injecting the mixture into guinea pigs:

No. of Squirrel.	Quantities Mixed.		Injected Into Pig. No.	Result in Guinea Pig.
	Squirrel Blood.	Virus.		
	c.c.	c.c.		
34	0.5	0.5	258	Pig protected; immunity test, pig died of spotted fever.
	1.0	.5	259	Do.
37	.5	.5	260	Pig Died of spotted fever.
	1.0	5.5	261	Pig had medium case of spotted fever; recovered.
38	.5	.5	262	Pig had mild case of spotted fever; immunity test, negative.
	1.0	.5	263	About same as pig 262.
Control	2.0	.5	264	Pig died of spotted fever.

These experiments simply show that the blood of the ground squirrel recently recovered from spotted fever has some power for neutralizing the virus of that disease when the two are mixed together, and that it remains, partly at least, in the blood of the ground squirrel for a few months. They also show that this neutralizing or protective power varies in different ground squirrels.

One conclusion, however, which may be drawn from the preceding work on the immunity and susceptibility of the ground squirrel to spotted fever is that the best method of searching for immune ground squirrels in nature is by inoculating them with the virus of that disease and subsequently making inoculations of their blood into guinea pigs.

The Badger (Taxidea Taxus.)

The susceptibility of the badger to spotted fever infection by inoculation was tried in a few cases. This animal is not found abundantly in the Bitter Root Valley, and during the season only four of them were obtained alive. They were inoculated intraperitoneally with virus obtained from the uginea pig. Before the badgers were inoculated their temperatures were taken on several successive days in order to determine the normal tmperature of the badger. It was found to vary considerably from day to day, as much as from 98 to 102.6 degrees Fahheit, the normal apparently being about 100 to 101 degrees Farrenheit. After the badgers were inoculated with the virus their temperatures were taken daily and at the end of certain intervals blood was withdrawn from their hearts by means of a syringe and injected into guinea pigs. As a result of injecting the badger with the virus of spotted fever the temperature range of that animal did not seem to vary from the normal, and consequently its temperature, like that of the ground squirrel, apparently does not furnish a reliable index as to whether or not the animal is infected.

The results of inoculating badgers with the virus of spotted fever and the subsequent injection of their blood into guinea pigs are shown in the following table:

No. of Badger.	Quantity of Virus Injected.	Duration from Date of Inoculation.	No. of Guinea Pig.	Quantity of Blood.	Result in Guinea Pig.
	c.c.	Days.		c.c.	
1	7	7	71	2.0	Negative. (1)
			72	3.0	Do.
2	10	5	130	1.0	Do.
			131	0.75	Do.
		8	145	.75	Do.
		10	152	1.0	Do.
3	6	5	132	1.5	Do.
			133	1.0	Do.
		8	146	0.5	Do.
			147	1.5	Positive. (2)
		12	162	0.75	Negative.
4	2	4	163	1.0	Do.
		7	167	0.5	Do.

(1) Negative means that the pig did not develop spotted fever.
(2) Positive means that the pig developed spotted fever.

It will be observed that of the thirteen guinea pigs which were inoculated with blood from the badgers only one of them (No. 147) developed spotted fever. This guinea pig died of spotted fever, the diagnosis of which was confirmed by injecting 0.5 c. c. of its blood into a fresh guinea pig which also developed the disease, but recovered. The negative results with the other 12 guinea pigs were later verified, except in the case of guinea pig No. 145, which died of pneumonia on the 15th day, by giving them the immunity test with the virus from which they all developed typical cases of spotted fever. It is worthy of note that although guinea pig No. 146 was injected with 0.5 c. c. of blood from badger No. 3 at the same time that guinea pig No. 147 was injected with 1.5 c. c. of blood from the same badger, it did not develop spotted fever. It is possible, however, that the blood of a larger percentage of the badgers would have been found infective for guinea pigs if the inoculation of guinea pigs had been done oftener or if a larger quantity of blood had been given them than was the case in the above experiments.

Prior to inoculating the badgers with the virus of spotted fever, some blood was withdrawn from their hearts in order to test its immunizing power for the virus of that disease. This was done by mixing definite quantities of the blood, 1 to 2 c. c., with the virus, usually 0.5 c. c., and then injecting it into guinea pigs. This experiment was repeated with the blood of badger No. 3 about one month after the badger had been injected with the virus. This was done in view of the fact that guinea pig No. 147 had been infected with spotted fever from this badger. In no case, however, did the badger blood that was mixed with the virus appear to give the guinea pigs any protection as they all developed spotted fever of about the same severity as did the controls which were guinea pigs that were given nothing but the virus.

Although the above results with badger No. 3 undoubtedly show that the badger may possibly be experimentally infected with spotted fever, the infection is apparently so slight and infrequent as to practically eliminate that animal from the probability of playing any part in keeping the infection alive or of spreading the disease in nature.

As the badgers used in these experiments came from the Bitter Root Valley, it can not be positively stated that they had not previously had spotted fever, by which they were rendered immune to further infection with the disease. This, however, is thought highly improbable, as the tick, **Dermacentor andersoni Stiles,** has never been observed feeding on the badger.

The Coyotes (Canis Lestes).

Five coyotes that had been captured in the valley during the previous. winter were obtained for experimental purposes Their susceptibility to experimental infection with spotted fever was tested in the usual way by intraperitoneal injections of the virus and subsequent inoculations of their blood into guinea pigs.

The blood of the coyote is rather toxic for guinea pigs and usually some of them die of peritonitis, percarditis, etc., following their injection with blood of the coyote.

The temperature of the coyote was found to be quite variable from day to day, the normal being about 101 to 102 degrees

Fahrenheit, although, without apparent cause, it sometimes ranged from 98 to 103.5 degrees Fahrenheit. It was found, however, that inoculating the animals with the virus of spotted fever never influenced in any way the range of temperature.

The following table shows the results of inoculating the coyotes with the virus of spotted fever and the subsequent injection of their blood into guinea pigs:

No. of Coyote.	Quantity of Virus Injected.	Duration from Date of Inoculation.	Number of Guinea Pig.	Quantity of Blood Injected.	Result in Guinea Pig.
	c.c.	Days.		c.c.	
1	5	7	73	3.0	Died second day, peritonitis.
			74	2.0	Died sixth day, peritonitis.
		9	111	1.0	Died fifteenth day, pericarditis and peritonitis.
			112	2.0	Negative. (1)
2	10	5	134	2.0	Do.
			135	1.0	Do.
		8	142	1.0	Do.
		12	160	.75	Do.
3	5	6	136	2.0	Do.
			137	1.0	Do.
		9	143	1.5	Died second day, peritonitis.
			144	.5	Died third day, peritonitis.
		13	161		Negative.
4	3	5	380	.25	Do.
			381	.75	Do.
5	2	5	182	.25	Do.
			183	.75	Do.

(1) Negative means that the pig did not develop spotted fever as a result of its injection with coyote blood, but did develop it when, about a month later, it was given the immunity test.

The above tests did not show the coyote to be susceptible to infection with spotted fever. While it could not be proven that these coyotes had not previously had spotted fever, it is not likely that they had, as they were caught during the winter when they were yet very small.

The Domestic Cat (Felis Domesticus).

The susceptibility of the cat was tried in four cases. As the cats that were used all came from the District of Columbia they undoubtedly had never been exposed to spotted fever infection. They were inoculated intraperitoneally with virus and after definite periods of incubation, inoculations of their blood were made into guinea pigs. The temperature of the cats, which was taken daily for 14 days after they were inoculated, was found to range from 100 to 102.6 degrees Fahrenheit. The cats showed no evidences of being sick at any time during the experiments. The blood of the cat was found to be more or less toxic for guinea pigs, and consequently several of the guinea pigs died in from two days to two or three weeks after they were inoculated. Their temperature curves were not at all characteristic of spotted fever and the necropsies usually showed the presence of peritonitis, pneumonia, pericarditis, or a similar condition, but no lesions of spotted fever. Further injection of their blood into fresh guinea pigs usually killed within two or three days.

The results of the experiments are shown in the following table:

No. of Cat.	Quantity of Virus Injected.	Duration from Date of Inoculation.	Number of Guinea Pig.	Quantity of Blood Injected.	Result in Guinea Pig.
	c.c.	Days.		c.c.	
1	1	5	349	0.5	Died of pneumonia on third day.
		5	350	.5	Died fifteenth day: lesions of peritonitis; none of spotted fever.
		8	367	.5	Died sixth day, of fibrinous pneumonia.
		5	351	.75	Died twenty-third day: pneumonia and pericarditis; no lesions of spotted fever.
2	2	5	352	.25	Negative; immunity test positive; recovered.
		8	368	.5	Do.
		5	353	.5	Do.
3	2	5	354	.5	Negative; immunity test positive; died.
		8	369	.5	Do.
		5	355	.5	Died fifth day of pneumonia.
4	3	5	356	.5	Died sixteenth day, peritonitis; no lesions of spotted fever.
		8	370	.5	Died second day, peritonitis.

These experiments do not show the cat to be susceptible to infection with spotted fever, neither do they prove that it is impossible to infect the cat, although it is very probable that if it can be done at all it will be only in a small percentage of cases. It is, therefore, very unlikely that the cat is in any way instrumental in spreading spotted fever except that it may possibly act as an agent for carrying ticks into dwelling houses.

The Weasel (Putorius Arizonensis).

Only two weasels that were in a physical condition suitable for experimental purposes were obtained. They were both trapped in the infected district. Their susceptibility to spotted fever infection was tested in the usual way.

Weasel No. 1 was inoculated intraperitoneally with 1 c. c. of virus, at which time the temperature of the animal was 101.4 degrees Fahrenheit, while on successive days it was 104, 103, and 98.6 degrees Fahrenheit. The animal was found dead on the fifth day following its inoculation, and 0.5 c. c. of its blood was then given to guinea pig No. 70. This guinea pig died of spotted fever within 12 days. Two days before this guinea pig died 0.5 c. c. of its blood was given to guinea pig No. 148, which also developed a typical case of spotted fever but recovered.

Weasel No. 2 was inoculated intraperitoneally with 0.75 c. c. of virus, and on successive days its temperature was 104.2, 105.7, 104, and 104.3 degrees Fahrenheit. On the fourth day after the weasel was inoculated 0.5 c. c. of its blood was given to guinea pig No. 168. This guinea pig, unfortunately, died of peritonitis on the fifth day following its injection. It was therefore impossible to say whether or not this guinea pig was infected with spotted fever. The inoculation of its blood into a fresh guinea pig would also no doubt have caused its death. Ten days after the weasel was inoculated with the virus 0.75 c. c. and 1 c. c. of blood were withdrawn from the animal's heart and injected into guinea pigs Nos. 170 and 171, respectively. The weasel died from the operation. Neither of the guinea pigs ran the temperature or otherwise presented any symptoms of spotted fever in the guinea pig. Guinea pig No. 170 became very much emaciated and died four weeks after it was injected and before it was given the immunity test. Guinea pig No. 171 was given the immunity test, from which it developed spotted fever and died.

It will thus be seen that the blood of weasel No. 1 was ineffective for a guinea pig on the fifth day of the weasel's inoculation, while the results with weasel No. 2 were negative in so far as the experiment was carried, but were not conclusive.

At necropsy there were no lesions of spotted fever apparent in either one of the weasels.

From the above it is evident that the weasel is susceptible to experimental infection with spotted fever. Further work, however, will be done along this line next year.

THE TREATMENT OF SPOTTED FEVER IN ANIMALS.

From the viewpoint of the inhabitants of the Bitter Root Valley, the treatment of spotted fever ranks in importance second only to the eradication of the disease. Their desire is for a remedy with which human cases of the disease may be successfully treated. This, of course, is quite natural, particularly when the high mortality rate of the disease there is taken into consideration.

Ricketts and his assistants did considerable work trying to produce, from the horse, a curative serum for the disease. They obtained a serum that undoubtedly had some protective powers, and although it was given only a limited trial in the treatment of human cases of spotted fever, the results obtained were not encouraging as to its efficiency in the treatment of the disease.

Since Ricketts's death Heinemann and Moore* have continued the work and have been able to produce a serum that has a high protective power for guinea pigs. It has been used in the treatment of human cases of spotted fever, but not yet to an extent to justify any deductions as to its value in the treatment of the disease. It probably exerts a beneficial effect at least when given early in the disease.

Dr. Karl Kellogg, of Stevensville, Mont., used sodium cacodylate, apparently with good results, in the treatment of two cases of spotted fever during the summer of 1911. One of the cases, however, was treated with serum before the treatment with sodium cocodylate was begun.

Encouraged by Kellogg's results, and considering that there are some indications pointing to the infection of spotted fever being protozoal in character, the treatment of spotted fever in guinea pigs and rhesus monkeys with certain drug preparations, particularly the arsenic compounds, was taken up at the Hygienic Laboratory. The drugs used were salvarsan (606), sodium cacodylate, and urotropin. The animals were inoculated with the virus of spotted fever, blood from a monkey sick with that disease being used for the purpose. Blood of the monkey was used because it was feared that the blood of the guinea pig might be more or less toxic for monkeys. The blood was aseptically withdrawn from the monkey's heart and defibrinated. In order to test the prophylactic powers of the drugs, the treatment of some of the animals was begun at the time they were given the virus and before the symptoms of the disease appeared. Usually, however, the treatment was begun when the temperature of the animal began to rise, about the third day following inoculation. The treatment was administered to the monkeys intravenously, through the vein of the hind leg, and to the guinea pig intramuscularly and intravenously. The monkeys were injected intraperitoneally with 1.5 c. c. of virus and 2 c. c. of normal saline solution. The results with the different drugs used are given below.

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* Heinemann, P. G., and Moore, J. J., Jour. Am. Med. Assn., Chicago, 1911, Vol. LVII, p. 198.

The Treatment of Monkeys With Salvarsan.

Monkey No. 4.

On September 28, immediately after injecting the virus, the animal was given intravenously 0.1 gram of salvarsan in a 0.5 per cent solution. The salvarsan was given at this time in order to test its prophylactic powers. The temperature of the animals at 10 a. m. on the days following was: 104, 102.6, 103.6, 105.5, 105.1, 105, 104, 102.7 degrees Fahrenheit and death. The animal died on the tenth day, the necropsy showing typical lesions of spotted fever. There was marked redness of the face, buttocks and extremities, and much hemorrhage under the skin over the entire body. The lymph glands in the groin, and the spleen, were typical of spotted fever.

Monkey No. 5.

The results of temperature, treatment, etc., are as follows:

September 28, monkey inoculated with virus.
September 29, 10 a. m., temperature 103.5 degrees F.
September 30, 10 a. m., temperature 103.6 degrees F.
October 1, 9:50 a. m., temperature 103 degrees F.

Given intravenously 15 c. c. of a 0.5 per cent solution of salvarsan=0.075 gram.

October 2, 10 a. m., temperature 103 degrees F.
October 3, 10 a. m., temperature 103.6 degrees F.

The dose of salvarsan as given October 1 was repeated.

October 4, 10 a. m., temperature 102.9 degrees F.
October 5, 10 a. m., temperature 103.4 degrees F.
October 6, 10 a. m., temperature 104.8 degrees F.
October 7, 10 a. m., temperature 105.2 degrees F.

Animal given 12 c. c. of 0.5 per cent solution of salvarsan=0.06 gram.

October 8, 10 a. m., temperature 101.3 degrees F.
October 9, 10 a. m., temperature 104.2 degrees F.
October 10, 10 a. m., temperature 103.3 degrees F.
October 11, 10 a. m., temperature 102.4 degrees F.

The temperature continued at normal and the monkey recovered.

Monkey No. 6.

September 28, money inoculated with virus.
September 29, 10 a. m., temperature 102 degrees F.
September 30, 10 a. m., temperature 103 degrees F.
October 1, 10 a. m., temperature 103.2 degrees F.

Given intravenously 20 c. c. of 0.5 per cent solution of salvarsan=0.1 gram.

October 2, 10 a. m., temperature 102.2 degrees F.
October 3, 10 a. m., temperature 103.6 degrees F.

Given intravenously 22 c. c. of a 0.5 per cent soltuion of salvarsan=0.11 gram.

October 4, 10 a. m., temperature 103.4 degrees F.
October 5, 10 a. m., temperature 102.8 degrees F.
October 6, 10 a. m., temperature 102.3 degrees F.

On October 30 the monkey was given an immunity test with 1.5 c. c. of virus from which there was no reaction, the temperature being taken for 10 days.

Monkey No. 11.

October 14, monkey inoculated with virus.
October 15, 9:30 a. m., temperature 103.1 degrees F.
October 16, 10 a. m., temperature 104.2 degrees F.
October 17, 10 a. m., temperature 104.9 degrees F.

From the monkey 0.5 c. c. of blood was taken and given to guinea pig No. 238, which developed spotted fever and died.

The monkey was given, intravenously, 12 c. c. of a 0.5 per cent solution of salvarsan=0.06 gram.

October 18, 10 a. m., temperature 105 degrees F.

The dose of salvarsan as given on the 17th was repeated.

October 19, 10 a. m., temperature 105.1 degrees F.

The animal was given, intravenously, 6 c. c. of a 0.5 per cent solution of salvarsan=0.03 gram.

October 20, 10 a. m., temperature 105.1 degrees F.
October 21, 10 a. m., temperature 105.1 degrees F.
October 22, monkey was found dead.

The necropsy showed the usual typical lesions of spotted fever.

The monkey died at 10:30 p. m.

The animal looked sick during the experiment, but there were no skin lesions of spotted fever apparent. At necropsy the animal was found to have a well-developed case of tuberculosis. The axillary glands were caseous and the liver, spleen, pancreas, and kidneys the seat of miliary caseous abscesses. The inguinal glands were enlarged but not caseous. It is therefore impossible to say what part spotted fever played in causing the death of this monkey. An inoculation of a guinea pig was not made from the monkey.

Monkey No. 12.

October 14, the monkey was inoculated with virus.
October 15, 9:30 a. m., temperature 102.9 degrees F.
October 16, 10 a. m., temperature 103 degrees F.
October 17, 10 a. m., temperature 101.2 degrees F.

From the animal 0.5 c. c. of blood was taken and given to guinea pig No. 239, which developed spotted fever and recovered.

The monkey was given intravenously 15 c. c. of a 0.5 per cent solution of salvarsan=0.075 gram.

October 18, 10 a. m., temperature 104.8 degrees F.
October 19, 10 a. m., temperature 104.7 degrees F.

The dose of salvarsan as given on October 17 was repeated.

October 20, 10 a. m., temperature 103.4 degrees F.
October 21, animal found dead.

The necropsy showed the lesions typical of spotted fever and pig No. 249, which was inoculated with blood from the monkey, died of spotted fever.

Monkey No. 13.

October 14, monkey inoculated with virus.
October 15, 9:30 a. m., temperature 102.2 degrees F.
October 16, 10 a. m., temperature 103.1 degrees F.
October 17, 10 a. m., temperature 104.9 degrees F.

0.5 c. c. of blood from monkey was given to pig No. 240, which developed spotted fever (recovery).

Monkey was given 18 c. c. of a 0.5 per cent solution of salvarsan=0.09 gram.

October 18, 10 a. m., temperature 104.4 degrees F.
October 19, 10 a. m., temperature 104.9 degrees F.

Monkey was given 15 c. c. of a 0.5 per cent solution of salvarsan=0.075 gram.

October 20, 10 a. m., temperature 104.7 degrees F.
October 21, animal found dead.

The necropsy showed the lesions typical of spotted fever, and pig No. 250, which was given 0.5 c. c. of blood from the monkey, developed spotted fever (recovery).

Control Monkey No. 10.

This monkey was used as a control for monkeys Nos. 4, 5, and 6. They were all inoculated with virus in the same manner and at the same time on September 28. The control monkey was given no treatment.

Its temperature at 10 a. m. on September 29 and the days following was 102.8, 102.8, 102.6, 105, 104.9, 105.5, 105.7, 104.6 degrees, and death.

The necropsy showed the usual typical lesions of spotted fever.

Control Monkey No. 16.

This monkey was used as a control for monkeys Nos. 11, 12 and 13, they all being inoculated with the virus on the same date and under the same conditions on October 14.

The temperature of this monkey at 10 a. m. on the day it was inoculated was 103.8 degrees Fahrenheit, and on the following days it was 102.9, 103.6, 104.1, 106, 105, 105.4, 105 degrees, and death.

This monkey ran a typical course of spotted fever and at necropsy showed the usual lesions of that disease.

The Treatment of Guinea Pigs With Salvarsan.

Guinea pigs were inoculated intraperitoneally with the virus of spotted fever and treated with a 0.5 per cent solution of salvarsan administered to them in different ways.

Guinea pigs Nos. 197 and 198 were given, intramuscularly in the left thigh, 0.025 and 0.03 gram, respectively, at the time they were inoculated with the virus. Both of these pigs ran marked courses of spotted fever with scrotal sloughing, but both of them recovered.

Guinea pigs Nos. 199, 200 and 201 were inoculated with the virus; and then three days later, when the temperature began to rise, they were given, intramuscularly in the left thigh, 0.025, 0.03 and 0.035 gram, respectively. These pigs died in 8, 5 and 7 days, respectively, with the symptoms and lesions of spotted fever.

As controls for the above, guinea pigs Nos. 207 and 208 were used, they simply being inoculated with the virus, but not treated in any way. They both died of spotted fever on the 18th and 12th days, respectively.

Guinea pigs Nos. 221, 222 and 223, three days after they were inoculated with the virus, were injected through the jugular vein with 0.01, 0.015, and 0.015 gram, respectively. They died of spotted fever on the seventh, ninth and eighth days, respectively.

Guinea pig No. 228 was used as a control for pigs Nos. 221, 222, and 223. It died of spotted fever on the tenth day following its inoculation with the virus of that disease.

The Treatment of Monkeys With Sodium Cacodylate.

Monkey No. 7.

Immediately after inoculating the monkey with the virus of spotted fever on September 28 it was given, intravenously through a vein on the back of the hind leg, 6 c. c. of a 1 per cent solution of sodium cacodylate=0.06 gram. The temperature of the monkey at 10 a. m. on the successive days was: 102.4, 102.9, 102.8, 103.2, 105.1, 105.5, 105.3, 105.3, 104.8, 103.4 degrees, and death. At necropsy the animal showed the usual typical lesions of spotted fever.

Monkey No. 8.

September 28, the monkey was inoculated with virus.
September 29, 10 a. m., temperature 101.8 degrees F.
September 30, 10 a. m., temperature 103.1 degrees F.
October 1, 10 a. m., temperature 103.6 degrees F.

Monkey was given, intravenously, 4 c. c. of a 1 per cent solution of sodium cacodylate=0.04 gram.

October 2, 10 a. m., temperature 105.4 degrees F.
October 3, 10 a. m., temperature 105.7 degrees F.

Given, intravenously, 5 c. c. of a 1 per cent solution of sodium cacodylate=0.05 gram.

October 4, 10 a. m., temperature 106.3 degrees F.
October 5, 10 a. m., temperature 105.5 degrees F.
October 6, 10 a. m., temperature 102.1 degrees F.

Monkey was found dead in the cage at 2 p. m. The necropsy showed the lesions that are considered typical of spotted fever in the monkey.

Monkey No. 9.

September 28, the monkey was inoculated with virus.
September 29, 10 a. m., temperature 102.4 degrees F.
September 30, 10 a. m., temperature 103.2 degrees F.
October 1, 10 a. m., temperature 104 degrees F.

Monkey was given, intravenously, 6 c. c. of a 1 per cent solution of sodium cacodylate=0.06 gram.

October 2, 10 a. m., temperature 104.6 degrees F.
October 3, 10 a. m., temperature 106 degrees F.

Given, intravenously, 8 c. c. of a 1 per cent solution of sodium cacodylate=0.08 gram.

October 4, 10 a. m., temperature 105.4 degrees F.
October 5, 10 a. m., temperature 105.5 degrees F.
October 6, 10 a. m., temperature 104.6 degrees F.

The dose of sodium cacodylate as given on October 3 was repeated.

October 7 the monkey was found dead in the cage and the necropsy showed the lesions characteristic of spotted fever in the monkey.

Monkey No. 10 was used as a control for monkeys Nos. 7, 8 and 9, all having been inoculated with the virus of spotted fever at the same time on September 28. For result with monkey No. 10, see page 60.

The Treatment of Guinea Pigs With Sodium Cacodylate.

Guinea pigs were inoculated with the virus of spotted fever and treated with sodium cacodylate, using for the purpose a 1 per cent solution of the drug.

Guinea pigs, Nos. 202 and 203, immediately after they were given the virus, were injected in the muscles of the left thigh with 0.015 and 0.02 gram, respectively. Pig No. 202 ran a typical and severe course of spotted fever with sloughing of the scrotum and peeling of the ears, but recovered, while pig No. 203 died of spotted fever on the sixteenth day.

Guinea pigs Nos. 204, 205, and 206, on the third day after they were inoculated with the virus, were injected subcutaneously with 0.015, 0.02 and 0.025 gram, respectively, and on the fifth day the dose in the case of each guinea pig was repeated. Guinea pigs Nos. 204 and 205 died of spotted fever on the tenth and ninth days, respectively, while pig No. 206 recovered after running a well-marked case of spotted fever.

Guinea pigs Nos. 207 and 208 were used as controls for the pigs treated with sodium cacodylate, the pigs all having been inoculated with the virus of spotted fever at the same time. For results with guinea pigs Nos. 207 and 208, see page 61.

The Treatment of Monkeys With Urotropin (Hexamethylenamine.)

Two monkeys were treated with intravenous injections of urotropin. The drug being very soluble in water, a 25 per cent solution was made and then filtered through Berkefeld filter before it was injected into the monkeys. By filtering the aqueous solution, a sterile preparation was obtained with which there was no danger of infecting the monkeys.

Monkey No. 14.

On October 14, the monkey was inoculated with the virus of spotted fever and immediately thereafter it was injected intravenously with 8 c. c. of a 25 per cent solution of urotropin=

2 grams. The monkey was given this same size dose of urotropin each day until October 22, on which date the animal was found dead in the cage. The temperature of the monkey on the days following its inoculation with virus was: 103.3, 102.3, 102.7, 105.6, 105, 104.8, and 104.8 degrees Fahrenheit.

Three days after the monkey was inoculated with the virus, 0.5 c. c. of its blood was given to guinea pig No. 241 which developed spotted fever and recovered. The necropsy of the monkey showed the usual lesions of spotted fever.

Monkey No. 15.

October 14 the monkey was inoculated with virus.
October 15, 10 a. m., temperature 102.5 degrees F.
October 16, 10 a. m., temperature 103.2 degrees F.
October 17, 10 a. m., temperature 105.3 degrees F.

0.5 c. c. of blood from the monkey was given to guinea pig No. 242, which developed spotted fever and recovered.

The monkey was injected intravenously with 12 c. c. of a 25 per cent solution of urotropin=3 grams.

October 18, 10 a. m., temperature 105.6 degrees F.

The does of urotropin as given on October 17 was repeated.

October 19, 10 a. m., temperature 104.7 degrees F.
October 20, 10 a. m., temperature 104.6 degrees F.

The dose of urotropin as given on October 18 was repeated.

October 21, 10 a. m., temperature 105.3 degrees F.

The dose of urotropin as given on October 20 was repeated.

October 22 the animal was found dead. The necropsy showed the lesions that are typical of spotted fever in the monkey.

As a control for monkeys Nos. 14 and 15, monkey No. 16 was used. See page 61.

The Treatment of Guinea Pigs With Urotropin.

Only two guinea pigs, Nos. 224 and 225, were treated with urotropin. Beginning on the third day after the guinea pigs were inoculated with the virus, they were treated on successive days with subcutaneous injections of urotropin as follows: Guinea pig No. 224 was given 1.5 grams, 0.75 gram, 1 gram, and 1 gram, while guinea pig No. 225 was given 2 grams, 0.75 gram, 1 gram, and 1 gram. Both pigs died of spotted fever on the ninth day after they were inoculated with the virus of that disease. As a control, guinea pig No. 228 was used (see page 61).

The following table will show the results of the treatment of the monkeys with salvarsan, sodium cacodylate, and urotropin:

No. of Monkey.	Treated with—	Result.
1	Not treated	Died on eighth day.
2	do	Died on ninth day.
3	do	Do.
4	Salvarsan	Died on tenth day.
5	do	Recovered.
6	do	Died on eighth day. (1)
7	Sodium cacodylate	Died on tenth day.
8	do	Died on eighth day.
9	do	Died on ninth day.
10	Control for Nos. 4 to 9	Do.
11	Salvarsan	Died on eighth day.
12	do	Died on seventh day.
13	do	Do.
14	Urotropin	Died on eighth day.
15	do	Do.
16	Control for Nos. 11 to 15	Do.

(1) This monkey was found at necropsy to have a well-advanced case of tuberculosis.

It will readily be observed that the results obtained above in the treatment of spotted fever in monkeys and guinea pigs with the different drug preparations that were tried are by no means encouraging in so far as the successful treatment of that disease is concerned. In fact, the administration of the drug seems, on the whole, as compared with the controls which received no drug treatment at all after being inoculated with the virus of spotted fever, to have hastened the death of most of the animals that were treated. Of the 10 monkeys that were treated, only one recovered. That one was treated with intravenous injections of salvarsan. The chances of finding a specific remedy for the treatment of spotted fever seem rather remote. Possibly, if the specific organism of that disease can be identified and isolated, a remedy for the disease may be procured. However, in this connection it must be borne in mind that there are already quite a number of diseases, the causative organisms of which are well known, but for which no specific remedies have yet been prepared.

SUMMARY AND REMARKS.

In the work on Rocky Mountain spotted fever which was begun on May 26, 1911, an infected district of about 8 square miles was selected, on which a concrete dipping vat was constructed, the dipping of domestic stock was begun, and considerable headway was made in destroying the wild mammals in the infected district that was selected for demonstrative purposes. The number of small wild mammals killed, by shooting and trapping, and collected was 3,465, of which 3,233 were ground squirrels. This does not include the number killed with poison or carbon bisulphide.

A search was made for the infection of spotted fever among the ground squirrels in nature, the results of which were negative.

The susceptibility to experimental infection with spotted fever was studied in the cases of 25 ground squirrels caught at random in the infected district. They were inoculated with the virus of spotted fever and subsequent inoculations of their blood made into guinea pigs. As shown by the results in the guinea pigs, 23 of the ground squirrels were positively infected with spotted fever, one of them was probably infected, while the results with one squirrel, the blood of which was injected into a guinea pig on the second day following its inoculation, was negative. In all probability this negative result was due to the early date in the period of incubation at which the blood was transferred from the ground squirrel to the guinea pig.

There is, therefore, no positive evidence that any of the 25 ground squirrels were immune to spotted fever. As these ground squirrels all came from an infected territory, and assuming that one attack of spotted fever in the ground squirrel renders that animal immune to further infection with that disease, these results tend to minimize the probability of the ground squirrel actually playing a part in the spread of spotted fever. Further work with ground squirrels from other infected territories will be done in order to determine whether or not immune ground squirrels can be found existing in nature.

Out of a total of four badgers that were experimented with, only one of them was found susceptible to infection with spotted fever, and of five guinea pigs that were inoculated with blood taken from this badger at three different times only one of them developed spotted fever. Provided that none of these badgers had an acquired immunity at the time they were experimented with, and it does not seem likely that they did, the badger is evidently only very slightly susceptible to experimental infection with spotted fever and very probably plays no part in the spread of the disease.

The results with experiments of infecting 5 coyotes and 4 domestic cats were negative. It is not thought that either one of these animals has anything to do with the spread of spotted fever except that the cat may possibly carry infected ticks into dwelling houses.

Only two weasels were experimented with, one of which was experimentally infected with spotted fever while the results obtained in the case of the other were negative but not conclusive. Although the weasel was found to be susceptible to infection, further work along this line will be done this year.

Rhesus monkeys and guinea pigs were infected with spotted fever and treated with different drug preparations, namely, salvarsan, sodium cacodylate, and urotropin. The results obtained, however, do not indicate that any of these drugs possess any value whatever either as a prophylactic or in the treatment of spotted fever, but on the contrary their administration seems on the whole rather to intensify the severity of the disease in animals as compared with the course of the disease in the controls.

The work on spotted fever will be again taken up early in the season of 1912 when the tick and the ground squirrel first make their appearance, it having been begun too late in 1911 to accomplish a great deal. The work will be continued on the same lines along which it was carried on in 1911. The dipping of domestic stock and the destruction of wild mammals in the selected district will be thoroughly carried out in order to determine the result that these measures may have in eradicating the tick from the district. There is no doubt that the domestic animals are a source of food for a great many adult ticks. However, the hope of completely eradicating them by dipping the domestic stock is rather discouraged by information obtained from reliable inhabitants to the effect that although the number of domestic animals has been greatly reduced in certain localities during past years the number of ticks has by no means been proportionately reduced.

Furthermore, the tick is found rather abundantly in places in the mountains at high altitudes and in localities that are practically never frequented by domestic stock. That the tick can be practically eradicated from the infected districts or even from the whole valley there is no doubt, but it will entail considerable cost and labor to do so. In this connection it may be remarked that the statement by Hunter and Bishopp* to the effect that the practical eradication of the spotted-fever tick from the Bitter Root Valley can be accomplished in three seasons for the approximate sum of $23,692, and that after that time the prevention of reinfestation of the valley can be easily accomplished by employing an inspector for six months' service each year is somewhat more optimistic than the facts would seem to warrant.

The dipping of domestic stock, the destruction of wild mammals, and the clearing and burning over of land are all excellent methods for eradicating the tick. The exact extent to which the dipping of domestic stock alone will eradicate the tick is as yet more or less problematical, but as soon as the efficiency of the different methods, either singly or together, can be demonstrated to the ranch owners and inhabitants they will no doubt give their hearty co-operation and utmost assistance in carrying on the work and furthering its success.

There is urgent necessity for a State law under which the dipping of stock in infected districts can be enforced. It should require the dipping of all stock in territories declared by the State Board of Health or its secretary to be infected. Experience has shown that most of the stock owners want their stock dipped, but some of them insist on waiting until it suits their own convenience to have it done, while a small percentage of them object, for one reason or another, to having anything done. They thus handicap the work and this should not be permitted in a condition as serious as spotted fever and where most of the stock owners are anxious to co-operate in stamping out the disease.

A State law should also be passed requiring property owners to make a reasonable effort to exterminate the rodents on their property.

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The following is a list of reprints previously issued available at the present time. Those marked (*) can be obtained only from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 5 cents a copy. All others may be obtained from the Surgeon General, Public Health and Marine-Hospital Service, Washington, D. C.

Copies of the Public Health Reports containing these articles will be found in most public libraries, as will also the reprints themselves.

*1. Precis upon the Diagnosis and Prevention of Smallpox. Reprint from P. H. R. No. 1, Vol. XIV, January 6, 1899. 14 pages. Paper.

2. Plan of Organization for Suppression of Smallpox in Communities not Provided with an Organized Board of Health. By C. P. Wertenbaker. Reprint from P. H. R. No. 42, Vol. XIV, October 20, 1899. 23 pages. Paper.

*4. The Prophylaxis of Plague by Preventive Inoculations. By Dr. A. Calmette, Director of the Pasteur Institute at Lille. Reprint from P. H. R. No. 34, Vol. 14, August 24, 1900. 4 pages. Paper.

*6. Yellow Fever Institute. Description of Organization. By Surgeon-General Wyman. Reprint from P. H. R. No. 39, Vol. XVI, September 27, 1901. 7 pages. Paper.

8. Plan for International Agreement of the American Republics for the Sanitation of Certain Seacoast Cities. By Surgeon General Walter Wyman. Reprint from P. H. R. No. 41, Vol. XVI, October 11, 1901. 13 pages. Paper.

*9. The Prevention of the Spread of Scarlet Fever. By H. D. Geddings. Reprint from P. H. R. No. 3, Vol. XVII, January 17, 1902. 8 pages. Paper.

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12. Prophylaxis against Yellow Fever. (Extract from a paper read by Dr. Juan Guiteras before the First International Sanitary Conference of American Republics, held in Washington, D. C., December 2–5, 1902.) Reprint from P. H. R. No. 31, Vol. XVIII, July 31, 1903. 6 pages. Paper.

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23. The Prophylactic Value of Vaccination. By Henry S. Mathewson. Reprint from P. H. R. No. 5, Vol. XXIII, January 31, 1908. 9 pages. Paper. (Second edition.)

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*27. The Danger and Prevention of Tetanus from Fourth of July Wounds. By John F. Anderson. Reprint from P. H. R. No. 25, Vol. XXIII, June 19, 1908. 4 pages. Paper.

28. Prevention and Destruction of Mosquitoes. By Joseph Goldberger. Reprint from P. H. R. No. 29, Vol. XXIII, July 17, 1908. 11 pages. Paper. (Third edition.)

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*30. California Ground Squirrels. By C. Hart Merriam. Reprint from P. H. R. No. 52, Vol. XXIII, December 25, 1908. 8 pages. Paper.

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*32. Campaign Against Ground Squirrels in Contra Costa County, California. By Rupert Blue. Reprint from P. H. R. No. 21. Vol. XXIV, May 21, 1909. 5 pages Paper. Out of print.

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72. Vegetables as a Possible Factor in the Dissemination of Typhoid Fever. By R. H. Creel. Reprint from the P. H. R., Vol. XXVII, No. 6, February 9, 1912. (Second edition.)

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79. Investigations of and Tick Eradication in Rocky Mountain Spotted Fever. A report of work done on spotted fever in co-operation with the State Board of Health of Montana. By Thomas M. McClintic. Reprint from the P. H. R., Vol. XXVII, No. 20, May 17, 1912.

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Rocky Mountain Spotted Fever

By

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ROCKY MOUNTAIN SPOTTED FEVER [*], [**]

By W. C. Rucker, Assistant Surgeon General, United States Public Health Service.

History.

For over a decade Rocky Mountain spotted fever has been a problem of great interest to the physician, the zoologist, and the sanitarian. Its geographic limitation, seasonal prevalence, intimate association with wood ticks, and variation in severity in different localities combine to make it one of the most interesting and intricate disease problems which have arisen in our generation. It has a peculiar interest, because apparently it is confined to the American continent, and it has therefore been considered appropriate to present a brief review of the progress in the study of the disease and to indicate the lines along which investigative and eradicative work should be carried on in the future.

Although the disease has been known in Idaho and Montana since 1873, the first specific reference to it in literature is to be found in the report of the Surgeon General of the Army for the fiscal year ending June 30, 1896 (77). It is there stated that "The surgeon[†] at Boise Barracks referred in one of his monthly reports to the prevalence of spotted fever in the civil settlements in the neighborhood of the post. On being requested to give fuller particulars concering this fever, he stated that as he had not seen any of the cases that occurred he had called upon his medical friends in civil life for information." These gentlemen (Drs. C. L. Sweet, W. D. Springer, R. M. Fairchild, L. C. Bowers, J. K. Dubois, D. W. Figgins, and H. Zipf) responded promptly and their reports constitute the first published accounts of Rocky Mountain spotted fever as a disease entity.

It was not until 1899, however, when Dr. E. E. Maxey, of

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[*] Reprint from the Public Health Reports, Vol. XXVII, No. 36, Sept. 6, 1912.

[**] This paper originally appeared in the Military Surgeon, Vol. XXIX, No. 6, Dec., 1911, pp. 631-657, under the title, "The problem of Rocky Mountain spotted fever." As republished here the text and bibliography have been amended so as to cover the subject to the present time.

[†] Then Capt. (now Lieut. Col., Deputy Surg. Gen., retired) Marshall W. [illegible]d, M. C., U. S. A.

Boise, Idaho, read a paper entitled "Some observations on the so-called spotted fever of Idaho" (32), before the Oregon State Medical Society, that the disease began to attract any widespread attention. This lucid paper expresses the opinion that spotted fever is a specific disease and gives an accurate description of its clinical manifestations.

In 1902, the then newly organized Montana State Board of Health selected for its first task the careful investigation of the disease, securing for this purpose the services of Drs. L. B. Wilson and W. M. Chowning, of the University of Minnesota. Their work, which was done in the Bitter Root Valley of Montana, constitutes the first serious laboratory study of the disease (12, 73, 74, 75, 76), and in a paper written July 1, 1902 (73), they suggested the role of the ground squirrel **(Citellus columbianus)** and the tick **(Dermacentor andersoni)** as host and vehicle of transmission, respectively. In the same year Surgeon J. O. Cobb, of the United States Public Health Service, visited the Bitter Root Valley and wrote a description of the disease (13). Subsequent investigations have been made by Ashburn (5, 6, 7), Craig (7, 16), and Keiffer (26), of the Army; Anderson (1, 2, 3), Stiles (65-71, inclusive), Francis and King ((27), and McClintic (36), of the Public Health Service; and by several others, the most noteworthy among whom are the martyred Ricketts (42-45, inclusive) and his associates.

Geographic Distribution.

The disease has been reported from nearly all the States in the Rocky Mountain group, California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming, each having foci. Cases have also been reported from the District of Alaska. The geographic distribution of the disease is shown as follows in tabular form:

Geographic Distribution of Rocky Mountain Spotted Fever.

States.		Reporter.
Alaska	Klondike	Gwinn (21).
California	Caineva	Snow.*
Colorado	Carbondale	Braden (57).
	Rifle	Le Rosignol and Hotopp (57).
Idaho	Valleys of the Weiser, Payette, Boise, and Wood Rivers; north bank of Snake River; southwestern Idaho.	Maxey (32).
Montana	West side Bitter Root Valley	Wilson (73) and Chowning; Anderson (1); Stiles (65); McClintic (36).
	Phillipsburg, Clinton, Camas Prairie.	Anderson (2).
	Rock Creek, Blackfoot, Rattlesnake, and Lolo Valleys.	McCullough (37).
	Bridger	Gates (2, 67).
	Livingston	Alton (65).
Nevada	Quinn River Valley	Kendall (2).
	Paradise Valley, Winnemucca, Fort McDermitt, Reno.	Robinson (57).
Oregon	Burns	Geary (19).
	Lakeview	Steiner (57).
	Merrill	Patterson (57).
Utah	Cedar Valley, Fairfield, Cedarfort	Noyes (57).
	Heber City	Wheritt (57).
Washington	Moses Lakes, Douglas County	Smith (62).
Wyoming	Thermopolis, Myersville, Shoshone River	Gates (2, 67).
	Crow Creek	Kieffer (26).
	South Pass, Fort Fetterman, Fort Steele, Cheyenne	Robinson (57).
	Cody, Meeteese	Bradbury (76).

*Personal letter.

Data regarding the prevalence of Rocky Mountain spotted fever in the known infected localities is very sparse except in Montana and Idaho. In the latter State Dr. Edward E. Maxey, of Boise, collected data on 380 cases which occurred during 1908. The following table shows the occurrence of the disease in the Bitter Root Valley from 1885 to 1911, inclusive, representing data collected by Wilson and Chowning, Anderson, Stiles and McClintic:

Human Cases of Rocky Mountain Spotted Fever in the Bitter Root Valley of Montana.

Year.	Cases.	Deaths.	Case Fatality Rate.	Year.	Cases.	Deaths.	Case Fatality Rate.
			Per cent.				Per cent.
1885	1	1	100	1900	12	9	75
1886	1	1	100	1901	14	10	71.4
1887	0	0	0	1902	21	15	71.4
1888	3	1	33.3	1903	14	9	64.2
1889	3	3	100	1904	11	9	81.8
1890	1	1	100	1905	....	....	....
1891	6	4	66.6	1906	....	....	....
1892	3	1	33.3	1907	....	....	....
1893	4	2	50	1908	12	5	41.6
1894	0	0	0	1909	28	13	46.4
1895	3	3	100	1910	19	14	73.6
1896	6	6	100	1911	16	6	37.5
1897	6	5	83.3	1912	9	7	77
1898	3	2	66.6	(*)	4	2	50
1899	23	14	60.8				

*Year not definitely known.

It might be well to point out at this time the necessity for the careful collection of data regarding the occurrence of cases in the various infected States. Rocky Mountain spotted fever certainly should be put on the list of reportable diseases.

Symptoms in Man.

Passing now to the consideration of the clinical aspects of the disease in man, Maxey's definition of the disease may be modified to read, "Rocky Mountain spotted fever is an acute, endemic, febrile disease, occurring chiefly during the summer months, transmitted by the bite of the tick, and characterized clinically by a continuous moderately high fever, severe arthritic and muscular pains, and a profuse petechial or purpuric eruption in the skin, appearing first on the ankles, wrists, and forehead, but rapidly spreading to all parts of the body."

After an incubation period varying from 3 to 10 days, usually 7, during which the patient may feel indisposed and complain of ill-defined sensations of cold, nausea, and weariness, there is a frank chill. If seen at that time the patient will generally complain of pain and soreness in the muscles, bones, and joints, especially in the lower lumbar region. Severe occipital headache and photophobia are frequent symptoms and the face may appear flushed and swollen. Epistaxis commonly occurs and constipation is the rule. The severity of the symptoms varies in individual cases, and is less severe in Idaho than in Montana.

Upon examination the face is apt to be flushed, and the conjunctivae congested and yellowish. The tongue is covered centrally with a heavy white coat, while its tip and edges are bright red. A slight bronchitis may exist, and the urine is scanty and may contain small amounts of albumen and a few casts. Prior to the initial chill there may be a little afternoon fever, but with the chill there is an abrupt elevation of temperature and on the successive days there is an evening rise with slight morning emissions. At any time from the eighth to the twelfth day, usually the tenth, the fastigium is reached, when, if the patient is to recover, a fall by lysis takes place, the curve reaching subnormal from the fourteenth to the eighteenth day and remaining so for three or four days. In certain of those cases which do not recover there is a continuous fever of 105 degrees F. or higher. In other cases there is a sharp drop in the temperature curve, followed by a sudden rise just before death.

The pulse is very rapid and apt to be thready. There is a progressive decrease in the erythrocytes and haemoglobin. A leucocytosis with considerable increase in the large mononuclears occurs.

The respiration rate is increased in proportion to the pulse. An initial bronchitis is not uncommon and hypostatic pneumonia sometimes occurs.

Usually on the third day (sometimes on the fourth) the eruption appears on the wrists and ankles, first as a macular roseola, which, as it spreads to the arms, legs, forehead, back, chest, and abdomen, in the order named, become papular and may terminate in indefinite blotches or petechiae which may become large ecchymotic spots. In severe cases even the palms, soles, and scalp may be invaded. From 12 to 48 hours are required for the rash to reach the maximum. The macules vary in size from a pin point to a split pea and are bright red except when the case is unusually severe, when they are dark purple. Not infrequently they assume this color after death. It was this sign which caused the earlier cases to be called "the blue disease,' or "black measles." The macules disappear readily on pressure, rapidly to return—the papules do not disappear on pressure until the patient is progressing to recovery. With the fall in the fever the eruption begins to fade, but for a considerable time after recovery it may reappear as a subcuticular mottling after free perspiration or a warm bath. Cases have been reported in which there was no exanthem. Late in convalescence there is a generalized desquamation. Gangrene of the ears, fauces, fingers or toes, scrotum, penis, or entire pudenda may occur as distressing sequelae. Haematogenous jaundice usually occurs, and in addition the face may have a bloated appearance, erasing the lines of expression and giving it a stupid look.

The teeth are covered with sordes early and the tongue is coated throughout the disease. This coating is at first white, but later it becomes light yellow and finally dirty brown. The mouth is dry and cracked. Constipation, sometimes extreme, exists throughout the disease. Initial nausea, which may extend throughout the disease, is not uncommon. There is splenic and hepatic enlargement.

The urine is high colored, acid, and reduced in amount. Albumin and granular, hyaline, and epithelian casts are found in about 50 per cent of the cases. Hemoglobinuria almost never occurs.

The mind is usually clear throughout the disease. During the period of invasion there may be restlessness and insomnia owing to the attendant pain in the bones and muscles. Later this is absent. Kernig's sign is not found. Ocular symptoms are very rare.

Symptoms in Animals.

The reactions which occur when laboratory animals are inoculated with the disease are fairly constant. Guinea pigs when given 0.5 c. c. to 5.0 c. c of defibrinated infected blood, serum, or washed corpuscles, subcutaneously or intraperitoneally, present a rise of temperature after an incubation period varying from two to five days. From the fifth to the seventh day the temperature may reach 107.6 degrees Fahrenheit. Coincident with the fastigium, the scrotum and testicles become swollen and oedematous, and subsequently the overlying skin of the pudenda becomes the seat of hypodermic hemorrhages of varying size and outlines. Vulvar changes occur in female guinea pigs, but are less constant. The soles of the feet and the ears are red and congested, and if the animal be depilated, reddish macules may be observed on the dorsal and lateral aspects of the body. Emaciation is rapid, and death usually occurs from the seventh to the eleventh day. Recovery, when it takes place, is gradual, and may be accompanied with scrotal sloughing, followed by deforming cicatrix formation. There is desquamation of the soles of the feet, and the ears become dry and brittle, subsequently dropping off, leaving a short, thickened, irregular stump. The animal is emaciated and may not regain its normal weight for several weeks. When the disease is transmitted by ticks the signs are much the same, except that there may be areas of necrosis and patchy alopecia at the points where the ticks attached.

In monkeys **(Maccacus rhesus)** the disease produces cyanosis of the face and ears, a skin eruption varying from an erythema to a macular and petechial marking distributed over the external aspects of the arms, legs, buttocks and back. The scrotum and penis are enlarged and haemorrhagic.

The rabbit **(Lepus sp.)** is mildly susceptible to the virus, but in far less severe form than in guinea pigs and monkeys. After an incubation period varying from three to six days, the temperature reaches 104 degrees Fahrenheit and falls by lysis Aside from congestion of the scrotum, no marked anatomical changes have been recorded. The susceptibility of the various domestic animals and the mammals of the infected zone will be discussed elsewhere.

Prognosis.

In the Idaho cases the prognosis seems to be very favorable, as a rule the case fatality rate averaging less than 4 per cent. The disease is far more lethal in Montana, and there the case fatality rate averages close to 75 per cent, although in some years it has fallen as low as 33.3 per cent. Death may occur as early as the third or as late as the eighteenth day of the disease. In general, if the patient survive the tenth day, the prognosis is far more favorable. Continuously high fever or a sudden drop in temperature are grave signs, as is also delirium or loss of consciousness.

Gross Pathology.

The pathological changes are not extreme, but they are fairly characteristic. In man rigor motis usually appears early and is intense. The skin changes observed at necropsy are practically the same as those seen ante mortem and include the small wounds the result of tick bites. Icterus is constant and cutaneous hemorrhages of varying size and shape are usually seen.

In the Idaho cases gangrene of the fauces, tonsils, and palate, and of the scrotum, penis, and vulva have been noted. Aside from occasional hypostatic congestion and a rare pneumonia the respiratory apparatus is usually normal. Epicardial hemorrhages over the ventricles were constantly found in Anderson's case (2). The heart muscle is flabby, soft, and pale. The right heart is usually full of firmly coagulated blood, while the left heart is contracted and empty. The spleen is usually enlarged to three or four times its normal weight, is dark purple, soft, and very friable. The liver is enlarged and shows cloudy swelling and fatty degeneration. The pancreas is about twice is normal weight. The intestines may show submucous hemorrhages. Le Count (28) notes the enlargement of the superficial and visceral lymph glands. The kidneys are usually enlarged and present subcapsular and pelvic hemorrhages. The other abdominal viscera are not markedly affected. The changes in the nervous system are not constant enough to be of value in the post-mortem diagnosis of the disease.

In guinea pigs the pathological changes noted include coagulation necrosis about the site of inoculation; enlargement of the superficial lymph glands, with central hemorrhages and degeneration; splenic and hepatic changes similar to those observed in man; enlargement of the suprarenal bodies; localized hemorrhages with necrosis of the pudenda; and gangrenous changes of the ears. The lesions in monkeys are practically identical with those observed in man.

Microscopic Pathology.

The microscopic "changes are of two sorts, those connected with the occlusions of vessels and the more diffuse lesions affecting entire groups of organs. The diffuse changes are hyperplasia of lymphoid tissues and cloudy swelling and acute fatty changes in organs commonly the seat of such lesions in acute infectious diseases. The focal lesions are more varied in their nature, since they include not only the processes leading up to the occlusion of vessels, but the results of such obstructions, necrosis in different degrees and the hemorrhages responsible for so many of the clinical and gross anatomic features of the disease as well as for the name 'spotted fever' (28)." The minute changes have been made the subject of a careful study by Le Count (28) to whose article the reader is referred.

Treatment.

Many methods of treatment have been advised and employed in the attempt to cure this disease. They run the gamut of the Pharmacopoeia from sage tea to quinine and they have returned to that tacit admission of ignorance "good nursing and symptomatic medication." Ricketts (53, 55) has produced a protective (and if given very early, and in large doses, curative) serum which Heinemann and Moore (22) have attempted to concentrate. The number of cases in which it has been used is too small to judge of its efficacy. Dr. Karl Kellogg, of Stevensville, Mont., and Dr. J Wilson Reed, of Victor, Mont., have each used sodium cacodylate with apparent success in a single case. McClintic (36) treated monkeys infected with Rocky Mountain spotted fever with sodium cacodylate, salvarsan, and uroptropin. None of these agents seemed to exert a beneficial effect on the disease. Until we are better informed as to the etiology of the disease all attempts at its cure must be empirical and groping.

Etiology.

When we attempt the consideration of the etiology of this disease we are in a certain measure entering a terra incognita. As noted by Maxey (32), in his original paper, spotted fever is a "place" disease, being definitely limited to a certain locality —for example, to a single side of a valley. It is also rather sharply limited to a definite season of the year, usually to the months of March, April, May, June and July. It attacks all ages and both sexes, although the greater number of cases have occurred in males between 30 and 40 years of age. Persons whose occupations take them into the wooded foothills seem more liable to the disease; therefore, the bulk of the cases have occurred in lumbermen, miners, prospectors, ranchers and sheepherders, and bridge builders, carpenters, civil engineers, and others concerned in railroad construction work. It is apparently noncontagious, more than a single case rarely occurring in a given household at the same time. It has been impossible to incriminate water or food of any kind as the vehicles of infection, although when Maxey presented his first paper he suggested that the drinking of snow water might be the means of receiving the disease.

The Tick Host.

Wilson and Chowning in their original report (73) suggested the hypothesis that the wood tick **(Dermacentor andersoni)** acted as the transmitting agent and offered in support of this theory several facts which may be thus summarized:

1. The appearance of the disease is coincident with the period of activity of the wood tick.
2. The disappearance of the disease is coincident with the disappearance of the wood tick.
3. The limitation of the disease in a certain locality suggests the conveyance of the germ to man by a temporary parasite "traveling slowly and not widely and which is not carried far by the wind. The tick answers this description."
4. The great bulk of patients give a history of having been bitten by ticks prior to their illness.
5. Mosquitoes may be eliminated from the problem because their appearance and disappearance does not coincide with that of spotted fever; because of their lack of geographic limitation; and because they would be more apt to bite and thus infect a greater number in a given family. Bedbugs and fleas are omni-present and perennial; spotted fever is not.

Cobb (13), Anderson (1, 2), Westbrook (57), and R. W. Smith (57) coincided in this view, but Stiles (65) was "unable to confirm this hypothesis." Ashburn (5) reached the same conclusion as Stiles.

In 1906, King (27) succeeded in transmitting the disease from one guinea pig to another guinea pig by an adult male tick and Ricketts (42-47) was able to similarly transfer the infection by an adult female tick. In the following year, 1907, Ricketts (46) demonstrated that infected ticks exist in nature on the west side of the Bitter Root Valley of Montana and by their bites he reproduced the disease in guinea pigs. He further showed that the larvae and nymphs and both adult male and female ticks infected by feeding on an infected animal may transmit the disease to normal susceptible animals; that larvae and nymphs may acquire the disease in a similar manner and that they are capable of transmitting it in their subsequent stages of development; that infected females may transmit the disease to their young through their eggs; that the infection is generalized in the body of infected ticks; that the virus remains active in the body of the nymphal tick; that infected ticks are infective as long as they live and will bite. From the foregoing it may be deduced that the tick is the disseminator of the casual agent of the disease in nature. As a final and clinching proof, McCalla (35) removed a tick from a man suffering with the disease and, with their consent, infected a man and woman by its bite.

Since it has been proven that the disease exists in ticks in nature, it is to be expected that the distribution of the disease is the same as the distribution of the dermancentor. This has been made the subject of a study by Bishop (9) and while Rocky Mountain spotted fever has not been reported from the entire life zone of this tick, with the exception of the cases which occurred in the Klondike, the disease has not been found outside the area which the tick infests. This includes the northern part of the Rocky Mountain region in the United States, and the river valleys and sagebrush plains to the west, the western corner of South Dakota, almost the entire States of Montana, Wyoming, and Colorado, the northern portion of New Mexico, Utah, and Nevada, all of the State of Idaho, the eastern half of Washington and Oregon, and the northeastern corner of California. It also occurs in Southern British Columbia and Eastern Alberta.

There has been more or less discussion regarding the taxonomy of this species, but that is a question for zoological nomenclaturists which need not be considered here, and it should be borne in mind that Maver (31) has transmitted the disease by three other species, **Dermancentor marginatus** (Utah), **Amblyomma Americanum** Lineaeus (Missouri), and **Dermancentor Variabilis** (Mass.). It may be of profit, however, to describe briefly the commonest form **(D. andersoni)** and to outline its life history.*

The Anatomy of Ticks.

Ticks, superfamily Ixodoidea, order Acarina, class Arachnida, represent the giant mites. Anatomically a tick may be divided into a head, rostrum, or capitulum, and a body. The capitulum consists of a neck which connects it with the body; a hard, usually quadrangular portion called the base, which presents two porose areas and supports the palpi, which are composed of four segments, the hypostome, and elongated structure in symmetrical halves, which are covered with minute recurving teeth, and the mandibles or biting apparatus.

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* The writings of Stiles (69-70) and Ricketts (42-56) have been freely drawn upon in the preparation of this description. For a more technical consideration of the subject the reader should consult Bull. 62, U. S. Public Health and Marine-Hospital Service, Hyg. Lab., 1910.

The body is more or less ovoid in shape and varies greatly in form, color, outline, and structure in the different species and at different periods of development. The body is divided for purposes of description into a dorsal surface, a ventral surface, and anterior, posterior, and lateral margins. The dosal surface presents a hard, chitinous plate, marked by two longitudinal grooves. This is called the scutum and is smaller in the female than in the male. The eyes are seen at each laterial margin of the scutum, and on each side of the median line, near the third and fourth legs, are small, oval, chitiuous structures called the dorso-submedian porose plates. Along the posterior margin of the body are the postero-marginal festoons, 11 in number. The ventral surface presents for examination the genital pore, situated between the coxae of the first three pairs of legs; the anus, similarly situated in the median line but behind the posterior pair of legs; and the stigmal plates placed laterally just behind the fourth pair of legs. The anterior, posterior, and lateral margins vary in the different species. The legs are four in number on each side and each is segmented into a cova, trochanter, femur, patella, tibia, and tarsus. Both the dorsal and the ventral surfaces present grooves, pits, hairs, and spines which are of value in distinguishing the various species.[*]

The Dermancentor Andersoni.

The Dermancentor andersoni Stiles (1905), male is oval, narrow in front, broad behind, with scutum variegated brown and white. Anteriorly there is an elliptical area, called the pseudoscutum, limited by a white border and possessing two lateral brown stripes, with a median brown stripe or spots between them. Behind this there are 4 brown stripes arranged in a curve, open anteriorly. Posterior to these there usually are 5 brown stripes, 1 central and 2 on each side. Elsewhere the whole dorsum is speckled with small brown dots. The 11 festoons of the posterior border are roughly quadrangular in outline and consists of a white area with 1 brown spot and small brown specks. On the ventral surface, it is noted that the first coxae arise by two roots, bidenate, while the other arise by a single spine. The fourth coxa is very large, being two or three times the size of the third. Opposite the second pair of legs is genital aperture. The stigmal plates are somewhat comma shaped.**

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[*] For a description of the internal anatomy see Christophers (S. R.), The Anatomy and Histology of Ticks. Calcutta, 1906.

[**] See Stiles' "The taxonomic value of the microscopic structure of the stigmal plates in the tick genus Dermacentor." Bull. 62, U. S. Public Health and Marine-Hospital Service, Hyg. Lab., 1906.

The noneengorged female is about the same size as the male, 5 by 2.5 mm. The body is oval and broader posteriorly than anteriorly. The scutum extends as far back as the third pair of legs and is marked like the corresponding portion of the scutum of the male. There is a dorsal marginal groove and three longitudinal grooves. Eleven festoons on the posterior margin. The genital aperature on the ventral surface is opposite the second coxa, and from it the genital grooves run backward, diverging laterally behind the fourth coxa and ending between the second and third external festoons. There is a short naomarginal groove. The replete female is about 16 by 10 mm. and deep brown or slate color.

Life History of D. Andersoni.

The adult male and female feed in common on various mammals, and it is during this time that copulation and fertilization take place. The female continues to feed for several days after fertilization until she has become a slate-colored, swollen ovoid body. This increase in size is due to the ingestion of blood from the host and the enlargement of the ovaries and beginning formation of hundreds, or even thousands of minute eggs. After complete engorgement, the female drops from the host and after a resting period of about two weeks begins oviposition. To accomplish this the head is bent ventrally until the capitulum rests on the edge of the genital opening. At the same time there is protruded from beneath the scutum a delicate white gelatinous membrane which terminates in two delicate cones covered with an adhesive secretion. The extrusion of this membrane covers the head, and as the two small sticky cones reach the genital orifice the egg is expelled onto them. The membrane is then withdrawn and the head extended, the eggs resting on the front of the scutum. In this way an adherent mass of eggs gradually forms in front of the tick.* Unless observed closely, it appears as though the eggs were being extruded from beneath the scutum. As this process continues the tick begins to shrivel and at the end of oviposition it dies. The number of eggs deposited varies from several hundred to three thousand.

The length of time before the eggs begin to hatch depends on the surrounding temperature. In the summer months it is from 30 to 50 days, but in the cold season it may be delayed for several months. From the egg appears the larval form of "seed-tick" stage. These are minute specks, which are first pale and soft, and later become covered with a hard brown coating. They have six legs and are without genital and spiracular orifices. They are seen in nature in clumps on blades of grass or twigs, where they wait with outstretched legs for passing mammals. Having attached themselves to a warmblooded host, they feed to engorgement in about six days. During this time the original bulk is increased many fold, reaching about the size of a head of a pin. The color, which depends on the character of the food taken, blood or serum, varies from light pink to dark brown. Having fed to surfeitment, the tick drops off and lies dormant for about four weeks prior to moulting. Here again the time varies, being as short as two weeks and as long as two months. Unless the larvae secure food within two or three weeks after hatching they die.

After the larval skin is cast, the nymph, having four pairs of legs and spiracular orifices but no genital aperature, emerges. It is about 1.5 mm. in length and is at first slightly yellow in color, but after feeding becomes brownish black. Again it awaits a host, and having secured one feeds from four to eight days, becoming greatly enlarged—4 by 2 mm.—and eventually dropping off as in the previous stage of its development. It does not immediately re-enter the dormant state, but may be active for a period varying from two to four weeks. This is apparently influenced by the atmospheric temperature. Eventually, however, it becomes quiescent and lies dormant for about a month, while the metamorphosis into the adult is being completed. When this is completed a second moult takes place and it emerges from the snowy white shell a mature tick, with genital orifices and the secondary sexual characteristics typical of the male or female. The adults now attach themselves to a warm-blooded host, and after a time copulation, fertilization, and oviposition take place, and the cycle is recommenced. It is believed that the tick produces but one

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* See Braum (M.), The Animal Parasites of Man. Wm. Wood & Co., N. Y., 361.

brood a year. It may be noted also that Cooley (15) quotes W. V. King, of the Montana Agricultural College, as suggesting the hypothesis that the life cycle of this tick (**D. andersoni**) is two years. Additional experimental evidence seems needful to prove this.

Mammalian Hosts of the D. Andersoni.

It is, of course, important that we know what animals act as the hosts for these ticks. This has not only a direct bearing on tick control, but it may also lead us to the discovery of the animal which acts as the intermediary host for the virus, provided, of course, that such is necessary for the perpetuation of the disease. Data has therefore been collected bearing on this important aspect of the question.

Animals on which the D. Andersoni has been found, their susceptibility to Rocky Mountain spotted fever, and the stage of development of the tick.

Animal.	Susceptible.	Adult.	Nymph.	Larvae.
Mule deer (Odocoileus hemoinus)	?	+	+	
Elk (Cervus canadensis)	?	+		
Mountain goat (Oreamnos montanus)	?	+	+	
Mountain sheep (Ovis canadensis)	?	+		
Pine squirrel (Sciurus hudsonicus richardsoni)	?		+	+
Yellow-bellied chipmunk (Eutamias lueteiventris)	+		+	+
White-bellied chipmunk (Eutamias quadrivittatus umbrinus	+		+	
Columbian ground squirrel (Citellus columbianus)	+		+	+
Side-striped ground or rock squirrel (Collospermophilus lateralis cinerascens)	+		+	+
Woodchuck (Marmota flaviventris)	+	+	+	+
White-footed mouse (Peromyscus manimulatus artemisice)	0		+	
Wood rat (Neotoma cinera)	+		+	
Meadow mouse (Microtus modestus)	0		+	
Porcupine (Erethizon epixanthum)	?	+		
Rock cony or rabbit (Ochotona princeps)	?	+	+	+
Snowshoe rabbit (Lepus bairdi)	?	+	+	
Cottontail rabbit (Sylvilagus nuttali)	+		+	
Coyote (Canis lestes)	0	+		
Badger (Taxidea taxus)	0	+		
Weazel (Putorius arizonensis)	+	+		
Black bear (Ursus americanus)	?	+		
Marten (Mustela c. origenes)	?	+		
Dog (Canis familiaris)	?	+		
Cow (Bos taurus)	0	+		
Horse (Equus caballus)	+	+		
Sheep (Ovis aries)	0	+		
Swine (Sus scrofa)	0	+		

1. Is the animal susceptible to the disease by inoculation?
2. Is the animal susceptible to the disease through tick bites?
3. Can the "tick cycle" be completed on the animal (i. e., receive the disease through ticks and subsequently infect another tick)?
4. Has the animal the disease in nature?

In studying this aspect of the question Ricketts endeavored to determine the following points with regard to the ground squirrel, the ground hog, the rock squirrel, the chipmunk, and the mountain or wood rat:

The results of his experiments may thus be tabulated:

SUSCEPTIBLE TO ROCKY MOUNTAIN SPOTTED FEVER.

Species.	Inoculation.	By bites.	Tick cycle.
Ground squirrel	+	+	+
Ground hog	+	+	+
Rock squirrel	+	+	+
Chipmunks	+	+	?
Mountain rat	+	?	

Mammalian Hosts for the Disease.

The question of the occurrence of the disease among mammals in nature has not yet been solved, although considerable work has been and is being done upon it. It is an enormous problem and involves the examination of great numbers of live wild animals, the determination of their immunity to spotted fever and the inoculation of their blood into laboratory animals to find out if they (the wild animals) have the disease in acute form. These points must be settled if we would discover the animal which perpetuates the disease.

During the summer of 1912, shortly before his heroic death, McClintic discovered an infected tick on the body of a Rocky Mountain goat **(Oreamonos montanus)** and it may be that the direction of the search for the mammalian host has been pointed out thereby. Certain it is that goats and spotted fever abound on the western side of the valley, while on the eastern side, where there is no fever, there are no goats. Also those valleys on the western side of the main valley, which have no goats, also have no fever. Furthermore it is stated that in those small valleys in which formerly large numbers of Angora goats **(Capara angorensis)** were kept, there was much fever, but that since the removal of these animals the disease has disappeared. These facts appear significant and worthy of investigation.

The Virus.

With regard to the virus itself, even less is known. Wilson and Chowning (73) described certain ovoid intracorpuscular bodies in both fresh and stained blood taken from persons suffering with spotted fever. Anderson (1, 2, 3) agreed with them that this organism, which they named "piroplasma hominis," was "very probably the cause of spotted (tick) fever." Ashburn (5) and Stiles (65-67) failed to confirm this view and the latter stated that "indications are not lacking, that at least some of the stages of the supposed piroplasma hominis consist in reality of vacuoles, blood platlets, blood dust, artifacts, and certain malaria parasites." Maxey, Simon, and Cole found no piroplasms in the blood of cases in Idaho, and neither Ricketts nor Kieffer secured evidence which convinced them of the existence of the parasite of Wilson and Chowning. Francis was unable to find the organisms and Craig expressed the belief that the supposed piroplasms were merely denegerated erythrocytes.

Ricketts (54) described a pleomorphic bacterium which he believed might bear a casual relation to the disease. The form which he most commonly found was that of "two somewhat lanceolate chromatim-staining bodies, separated by a small amount of eosin-staining substance." These bodies were found in the blood of men, animals, and ticks infected with the disease, and seemed to stain best with Giemsa's stain. The eggs of infected ticks from both Montana and Idaho were found to contain large numbers of minute bipolar-staining bacilli, apparently in various developmental stages. These organisms are found in large numbers in the salivary glands, alimentary sac, and ovaries of infected females, but they have not been found in the viscera of noninfected male and female ticks. This bacillus has not been grown on artificial media. Ricketts suggested for it the name "the bacillus of Rock Mountain spotted fever." He found that it does not agglutinate with low dilutions of immune human serum, but agglutinates distinctly in dilutions of 1 to 10, 1 to 20, and 1 to 40. It does not agglutimate with the higher dilutions. Normal human serum, on the contrary, caused clumping in a dilution of 1 to 1, a very slight agglutination in 1 to 10, and none at all in the higher dilutions. In immune guinea pig serum complete agglutination was present in dilutions up to 1 to 160. Normal guinea pig serum produced practically no agglutination at all. Until further proof is brought forward the casual role of Rickett's bacillus must be considered as unproven, although there are many facts which strongly suggest it as the infecting agent.

Whatever may be the cause of Rocky Mountain spotted fever, however, several facts regarding it have been clearly established. It is nonfiltrable; its infectiousness is largely destroyed by grinding it in a ball mill. At 50° C. the infectiousness of the virus is destroyed in 25 or 30 minutes. Infected blood kept in the ice compartment of a refrigerator loses its infectiousness after 15 or 16 days. The pathogencity of the virus is lost between 24 and 48 hours after complete desiccation. It may be kept alive by passage through guinea pigs, monkeys, rabbits, and ground squirrels **(Citellus columbianus).** The virus is present in the body fluids generally. It produces a rather high degree of immunity.

Whether the organism of Rocky Mountain spotted fever be a protozoon or a bacterium, the fact that it is transmitted to man by the bite of the tick suggests the necessity of some host of mammal for the perpetuation of the disease. It is true that in malaria, the protozoon disease type, the hemaneba has but two life cycles, but it is apparent that the opportunities for biting man which the short-seasoned tick possesses are infinitely less than those of the Anopheles. Neither is the disease analogous in its etiology to yellow fever nor to the tick fever of Africa, because both the **Stegomyia calopus** and the **Ornthodorus moubata** are essentially domestic in their habits, whereas the **Dermacentor andersoni** comes in contact with man only accidentally. Also the feeding habits of this species would preclude man from being anything but an accidental host. Hereditary transmission to the eggs of infected females explains how the disease may be kept alive from one spring to the next, but would not account for the perpetuation of the disease, since not more than 50 per cent of the female transmit the disease to their young. At this ratio, when it is considered that on account of the many accidents of nature, only a small percentage reach maturity and only a small number of these become fertilized, it would be a matter of a short time only until the disease became extinct from natural causes.

The domestic and wild animals remain to be considered as possible hosts. This has already been discussed with regard to the wild animals and among them the search has been narrowed down to a few small mammals. Among the domestic animals, the horse has a relative resistance to the disease, while the ox, sheep, and the fowl have a demonstrated resistance. Cats and dogs may possibly play a part in keeping the virus alive, but it is extremely improbable. The larger wild mammals such as deer, elk, bear, etc., wander over wide stretches, certainly into districts where spotted fever does not prevail and are never in continuous close proximity to human dwellings. For the present they may be eliminated from the problem. From the list of larger wild mammals the mountain goat should be excepted. Its range is pretty well confined to the western side of the valley and the Clearwater country beyond. As has been said before, this species should certainly be taken into account.

The white-footed mouse, meadow mouse, coyote and badger are apparently not susceptible to the disease by inoculation, and since rabbits are infected with some difficulty the rock cony, snowshoe rabbit, and cotton-tail rabbit may be dropped from consideration. Of the animals which remain, the ground squirrel, the ground hog, the rock squirrel, the chipmunk, the mountain rat, and the weazel seem to be the most important. On account of the prevalence of the ground squirrel (Citellus columbianus) in the infected zone this species has been regarded with the greatest suspicion, although it is not impossible that several other species may also act as hosts for the virus. The small mammals mentioned certainly enter the problem as sources of food supply for the tick.

Prophylactic and Eradicative Measures.

We are dealing then with a disease whose cause and intermediary host are unknown, but whose disseminating agent we know and can attack. For the present the tick must be the focal point of all phophylactic and eradicative measures. Inasmuch as domestic stock furnish a convenient supply of food for the tick during its various developmental stages, and that the female tick is fertilized during feeding, the killing of ticks on cattle, horses, and sheep is of great importance. This is accomplished by dipping the tick infected animal in crude oil or some of the well-recognized arachnicides, such as cresylic acid, the arsenic salts, or extract of tobacco. This should be done at frequent intervals from March 1 to July 15 and should include all the animals in the infected zone. If for any reason it s not desired to dip any particular animal the ticks may be picked off every four or five days and destroyed.

The clearing and burning of land is a useful measure. This kills the tick directly, and on account of the exposure to the bright sunlight prevents the hatching of the eggs. The feeding of cattle in tick-free lots, if done universally, would prevent any increase in the number of ticks. The alternation of pasture has been found of service in combating Texas tick fever and might be of use in the eradication of Rocky Mountain tick fever.

The slaughter of the small mammalian hosts has long been considered a logical measure. This applies particularly to the ground squirrels, which are not only a perineal source of food and habitation for the larval and nymphal ticks, but which may possibly prove to be the intermediary host for the virus. The methods to be used in the destruction of these pests were fully described in a previous paper.*

Personal prophylaxis is, of course, very important and includes the wearing of tick-proof clothing by all persons entering the infected zone during the season of tick prevalence and the careful daily search of the body for ticks which may have attached themselves and have escaped notice. Ticks should be removed as soon as discovered. In doing this the tick should be given a gentle pull, lest the head be torn off and left in the skin to make a very annoying infection nidus. Another way to remove the tick is to grease it. This closes its respiratory spiracles and causes it to loosen its hold and drop off. When attached very firmly and for some time they may be pried off by a needle thrust into the skin immediately beneath the tick's head. After the removal of the tick the wound should be cauterized with a toothpick dipped in 95 per cent carbolic acid. If there is any suspicion that the tick was received in the zone of infection the bitten person should be given a protective dose of Rickett's serum.

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Additional copies of this publication may be procured from the SUPERINTENDENT OF DOCUMENTS, Government Printing Office, Washington, D. C., at 5 cents per copy.

Registration of Births and Deaths.

During the last two years the registration of births and deaths has become more and more complete until we feel that we have at least a fairly complete record of the deaths that have occurred in the State and a nearly complete record of all the births.

The births that we fail to get and that we have the greatest trouble in getting are those attended by midwives, or people who do not even pose as midwives, but simply act in a neighborly capacity. We trace these births down when we hear of them and make every effort to secure a complete report.

In Table VI we present the deaths as they have occurred during the two years 1910 and 1911. In this table the deaths are shown by counties and principal cities and are arranged according to the chief causes of death.

In Tables VII and VIII the deaths as reported are presented so as to show all causes of deaths and the age at which death occurred and sex of the deceased.

In Table IX we present a study of the population as shown in 1900 and 1910 by the United States Census Bureau. Using the change in population between 1900 and 1910 as a basis, we have estimated the increase or decrease in population and from this estimated the population for 1911. This method is not entirely correct, though it is the method used by the United States Census Bureau and in order that our figures may tally with theirs we use the same system used by them namely, allowing ten per cent of the increase during ten years as the actual increase for the next year.

This, however, shows that in 1910 Great Falls had a population of 982 less than that shown in 1900. Those of us who live in Montana and have watched the growth of the State realize that this is not an actual fact, that Great Falls did not have 982 less people in 1910 that she did in 1900. Therefore there is a mistake in the population as given either in 1900 or 1910, and she is not literally entitled to the decrease of 98 between the population shown for 1910 and that estimated for 1911. But, as stated before, we have used the method of estimation in use by the United States Census Bureau and this gives Great Falls an actual decrease of 98 over that during the ten years from 1900 to 1910. We find that using this method of estimation Great Falls is given a death rate of

18.2 per thousand. This is not fair to Great Falls. Her population should probably be somewhere in the neighborhood of 15,000.

In Granite County where a marked decrease is shown between 1900 and 1910, we believe that this decrease is an actual decrease. Her death rate would indicate this decrease, as would also her birth rate.

In Madison County we also note a decrease in population, but we believe that Madison has increased in her population during 1911. This belief is based on observation and also on the fact that Madison County shows a higher death rate than other counties in our State under similar conditions.

Finally, in estimating death rates, we find that in 1910 we had a death rate of 10.5 per thousand population, while in 1911 we show a death rate of 10.2 per thousand population. But as a matter of fact we have done better than this, for in 1910 we had no returns of deaths from Indian Reservations, whereas in 1911 we had returns of 236 deaths from Indian Reservations. If these 236 deaths from Indian Reservations are deducted from the total deaths for the year, we find a death rate of 9.4 per thousand population. We make this deduction, not because we are entitled to it in estimating our death rate because the Indians are counted when our population is taken, but we make the deduction in order that we may compare the death rate of 1910 with that of 1911, which shows, when the deaths from Indians are deducted, a reduction of 1.1 per thousand instead of 0.3.

If now you will compare the reduction in deaths from communicable diseases, namely diphtheria, scarlet fever, typhoid fever and enteric or acute intestinal diseases, you will find that this reduction of deaths in 1911, as compared with the deaths in 1910, occurred almost entirely among these preventable diseases.

We believe that great work has been done in advertising the material resources of this State, but we also believe that it at least would not deter prospective settlers from coming here if the low death rate from preventable diseases in our State was brought more forcibly to their attention. One of our great troubles seems to lie in the fact that our newspapers (and here our newspapers do not differ from those of other localities) are looking for something sensational. A death from smallpox for instance is a matter to be paraded under scare headlines on the first page, while the reduction in deaths from preventable diseases is condensed into the smallest possible space. This saving of life is apparently a mere matter-of-fact proposition, but prospective citizens of Montana are looking into this question, as is indicated by the frequent letters received at this office inquiring into the death rate in this State from preventable diseases.

Referring to Table XI. This presents the births as they have occurred in 1910 and 1911 in the various counties and principal cities in the State. We find that we had in 1910 an excess of 2,128 births over deaths, and in 1911 an excess of 3,536 births over deaths. In other words, of the estimated increase in population in this State of 13,272 during the year 1911, 3,536 have resulted in excess of births over deaths during that year, which would seem to indicate that Montana is doing more to increase her own population than is being done for her by people coming in from other states.

Turning to Table X, in which we present the records from the United States Census Bureau relative to death rates in various states, we find that only two States show a death rate lower than Montana. These two other States are South Dakota and Washington. I have never talked with the Health Officer of South Dakota on this subject, but the Health Officer of Washington I have talked with repeatedly and he informs me that there are no returns from the Indian Reservations in Washintgon and as stated above, if we deduct the death returns from the Indian Reservations during 1911 our death rate would be 9.4, which would make us a little lower than the death rate in Washington for 1909 which was 9.8 per thousand.

TABLE VI.

Deaths (Not Including Still Births) Reported to the State Board of Health Counties, Principal Cities,

JANUARY.

	Smallpox.		Spotted (Tick) Fever.		Tuberculosis.		Diphtheria.		Scarlet Fever.		Measles.		Typhoid Fever.		Meningitis.	
	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.
Beaverhead	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Blaine	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Broadwater	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
Carbon	...	...	...	...	1	...	...	...	...	...	...	...	...	1	...	...
Cascade (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Great Falls	...	...	...	...	1	...	3	...	...	1	...	...	...	...	...	...
Chouteau	...	...	...	...	2	...	...	...	...	...	...	...	...	1	...	...
Custer	...	...	...	...	1	1	1	...	...	...	...	...	...	...	...	...
Dawson	...	...	...	...	...	1	...	1	...	...	...	...	...	...	...	...
Deer Lodge (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Anaconda	...	...	...	...	1	2	...	...	...	...	...	...	...	...	...	...
Fergus	...	...	...	...	...	...	...	...	...	2	...	...	...	...	1	...
Flathead (Excl. of)	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
Kalispell	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Gallatin (Excl. of)	...	...	...	...	1	1	...	...	...	...	...	2	...	...	...	...
Bozeman	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Granite	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Hill	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Jefferson	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	1
Lewis and Clark (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...
Helena	...	...	...	...	2	2	...	...	1	...	...	...	2	1	1	3
Lincoln	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Madison	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...
Meagher	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Missoula (Excl. of)	...	...	...	...	2	4	...	...	...	...	...	...	...	...	...	...
Missoula City	...	...	...	...	2	1	...	...	...	...	...	...	1	...	...	...
Musselshell	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Park (Excl. of)	...	...	...	...	2	1	...	...	...	...	...	...	...	...	...	...
Livingston	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Powell	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ravalli	...	...	...	...	1	...	...	1	...	...	...	...	...	...	...	...
Rosebud	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...
Sanders	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Silver Bow (Excl. of)	...	...	...	...	9	8	1	...	...	1	...	...	...	...	...	...
Butte	...	...	...	...	11	14	2	1	2	...	...	1	...	1	2	1
Sweet Grass	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Teton	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Valley	...	...	...	...	1	6	...	...	...	...	...	...	...	...	...	...
Yellowstone (Excl. of)	...	...	...	...	...	...	1	1	...	...	...	...	...	2	...	...
Billings	...	...	...	...	1	1	2	...	...	1	...	...	...	2	...	...
Totals	...	...	...	...	41	46	10	4	5	5	...	4	3	8	5	5

TABLE VI.

During the Two Years Ending December, 31, 1911, Arranged According to and Principal Causes.

JANUARY.

Whooping Cough.		Pneumonia.		Nephritis.		Organic Heart Disease.		Malignant Tumors.		Acute Intestinal Diseases.		Violence.		Suicide.		Alcoholism.		All Other Causes.		Totals.	
1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.
...	...	2	2	...	...	2	1	1	...	...	...	...	1	...	1	....	....	2	1	7	6
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	....	....	....
...	...	1	...	...	...	...	...	...	1	...	1	...	7	...	....	....	....	....	1	2	10
...	...	4	5	1	...	...	2	...	...	...	...	...	2	1	....	....	....	2	6	9	16
...	...	...	4	1	...	1	1	1	...	...	1	...	...	...	....	....	....	7	2	10	8
...	...	2	2	...	1	2	4	...	2	...	...	2	...	1	....	....	....	9	9	20	19
...	...	1	5	...	2	1	1	...	...	...	...	1	...	1	....	....	...	....	2	6	12
...	...	...	...	...	1	...	1	...	1	...	...	...	...	...	....	....	1	3	4	5	8
...	...	1	5	...	...	...	...	1	...	...	...	1	...	...	....	....	....	2	2	5	9
...	...	1	2	...	...	...	...	...	...	...	...	...	...	...	1	....	....	6	8	7	11
...	...	5	1	2	1	...	2	...	...	...	...	2	1	...	....	....	....	5	5	15	12
1	...	1	...	...	2	...	2	...	...	...	...	1	1	...	....	....	....	6	2	10	9
...	...	...	2	...	1	...	2	...	1	...	...	4	3	...	....	....	....	1	2	6	11
...	...	...	1	1	...	...	2	1	...	...	...	1	...	...	....	....	....	4	....	7	3
...	...	1	...	...	...	...	...	1	...	...	...	...	1	...	....	....	....	2	4	5	11
...	...	1	2	2	...	2	1	...	...	...	3	...	...	...	....	....	....	6	1	11	5
...	...	1	...	1	...	...	...	...	...	1	...	...	...	...	....	....	....	....	....	3	....
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	....	....	....
...	...	...	1	...	...	1	...	...	...	...	...	1	...	...	....	....	....	2	2	4	5
...	...	...	1	...	...	2	1	...	...	...	...	3	...	...	....	....	....	1	1	7	3
...	...	1	1	2	1	1	1	2	2	...	...	...	...	...	....	....	....	6	2	18	13
...	...	...	...	...	...	1	...	...	...	...	...	...	1	...	....	....	....	....	....	1	1
...	...	1	4	1	...	2	3	...	...	...	...	1	...	...	....	....	....	3	5	9	13
...	...	2	1	...	...	1	...	...	...	...	...	...	1	...	....	....	....	....	1	3	3
...	...	...	3	...	...	...	1	...	...	...	...	2	3	...	....	....	....	2	5	6	16
...	1	2	4	1	2	2	1	1	1	...	...	3	...	1	....	....	....	6	5	9	15
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	....	....	....
...	...	1	1	2	...	1	...	...	...	...	...	...	1	...	....	....	....	2	1	8	4
...	...	...	...	1	...	...	...	1	...	...	...	...	...	...	....	....	....	1	2	3	2
...	...	...	3	...	...	1	...	...	1	2	...	1	1	...	....	....	....	1	2	5	7
...	...	2	3	...	2	1	...	...	1	...	...	1	...	...	....	1	....	3	3	9	10
...	...	1	3	...	...	...	1	...	...	...	...	1	1	...	....	....	....	....	2	3	8
...	...	...	...	...	...	...	1	...	...	...	1	...	...	...	....	....	....	....	1	....	3
...	...	2	5	3	1	2	2	...	...	...	2	1	5	...	....	....	....	8	5	26	29
2	...	3	8	2	...	3	9	...	3	...	2	3	1	1	3	1	2	15	23	47	69
...	...	...	4	...	1	...	1	...	...	...	...	...	...	...	....	....	....	1	3	2	9
...	...	...	1	...	...	...	1	...	...	...	...	1	...	...	....	....	....	1	4	2	7
...	...	...	4	...	1	...	1	...	...	...	1	...	1	...	....	....	....	1	3	2	17
...	...	...	...	...	...	1	...	...	...	...	...	4	1	...	....	1	....	4	1	11	5
...	...	...	3	1	2	4	2	1	...	...	1	3	...	1	....	2	....	4	5	19	17
3	1	36	81	21	18	31	44	10	13	3	12	37	32	6	5	5	3	116	125	332	406

TABLE VI.—(Continued).

FEBRUARY.

	Smallpox.		Spotted (Tick) Fever.		Tuberculosis.		Diphtheria.		Scarlet Fever.		Measles.		Typhoid Fever.		Meningitis.	
	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.
Beaverhead	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Blaine	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Broadwater	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Carbon	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	1
Cascade (Excl. of)	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Great Falls	...	...	...	...	2	1	1	...	...	...	...	...	...	...	...	...
Chouteau	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...
Custer	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
Dawson	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1	...
Deer Lodge (Excl. of)	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Anaconda	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Fergus	...	...	...	...	...	...	...	...	...	1	...	...	...	1	...	...
Flathead (Excl. of)	...	...	...	...	...	2	...	...	...	...	...	1	...	...	...	...
Kalispell	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...
Gallatin (Excl of)	...	...	...	...	...	2	...	...	...	1	...	1	...	...	...	...
Bozeman	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Granite	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Hill	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Jefferson	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Lewis and Clark (Excl. of)	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	1
Helena	...	...	...	...	...	2	...	...	1	...	...	...	...	...	...	...
Lincoln	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Madison	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
Meagher	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Missoula (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Missoula City	...	...	...	...	...	2	...	...	...	...	...	2	...	1	2	...
Musselshell	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Park (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Livingston	...	...	...	...	...	...	...	1	...	...	...	...	...	...	1	...
Powell	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ravalli	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Rosebud	...	...	...	...	...	4	...	1	...	...	...	...	...	...	...	...
Sanders	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Silver Bow (Excl. of)	...	...	...	...	4	4	...	...	1	...	...	...	...	...	...	1
Butte	...	...	...	...	8	8	...	...	2	...	...	...	...	...	...	3
Sweet Grass	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Teton	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Valley	...	...	...	...	1	3	...	1	...	...	...	...	...	...	...	...
Yellowstone (Excl. of)	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Billings	...	...	...	...	1	1	2	...	...	...	...	...	1	1	...	...
Totals	...	...	...	...	25	32	4	3	5	2	...	4	1	3	5	8

TABLE VI.—(Continued).

FEBRUARY.

Whooping Cough.		Pneumonia.		Nephritis.		Organic Heart Disease.		Malignant Tumors.		Acute Intestinal Diseases.		Violence.		Suicide.		Alcoholism.		All Other Causes.		Totals.	
1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.		
...	...	1	1	3	...	...	...	...	1	...	...	1	...	...	...	...	1	1	4	6	7		
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...		
...	...	...	1	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	1	...	4		
...	...	2	2	...	...	1	1	1	...	1	3	...	...	...	...	...	...	3	6	12	10		
...	...	...	2	...	...	1	2	...	1	...	2	...	...	...	...	...	...	1	7	4	13		
...	...	3	4	...	...	1	3	1	2	1	2	3	...	...	...	1	...	8	9	19	24		
...	...	...	1	...	1	1	...	...	...	1	2	1	...	...	...	...	...	2	6	8	9		
...	...	...	1	...	...	...	...	...	1	...	2	1	...	...	...	...	...	...	2	3	5		
...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	...	...	...	3	3	8		
...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	4	1	5	2		
...	...	3	3	...	1	1	...	...	...	1	1	...	...	...	1	...	...	9	7	17	11		
...	...	2	3	...	...	...	...	...	...	...	...	2	...	...	...	...	...	2	5	4	12		
...	...	1	1	...	...	...	1	...	1	...	1	4	...	...	...	...	...	...	3	2	13		
...	...	1	...	2	...	...	...	...	...	...	...	...	1	...	...	...	...	4	...	10	...		
...	...	2	3	...	1	...	...	1	1	...	...	...	...	...	...	...	...	1	1	4	10		
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	1	1		
...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1	...	1	1		
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...		
...	...	2	...	...	...	1	1	...	...	...	...	...	...	...	...	1	...	...	2	3	4		
...	...	...	1	...	...	...	...	1	...	...	4	1	...	...	...	...	...	1	...	7	3		
...	...	1	1	2	1	5	3	1	1	1	2	1	1	...	...	...	...	6	9	19	19		
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	3	...	3	1		
...	...	2	...	...	...	...	...	...	...	...	4	...	...	...	...	...	...	...	1	7	1		
...	...	...	1	1	...	1	...	...	...	...	...	2	...	...	...	...	...	...	...	2	3		
...	...	...	2	...	...	...	...	...	...	1	...	1	...	1	...	...	...	2	2	2	7		
...	1	1	3	1	...	1	3	...	...	...	2	3	1	...	1	1	...	3	5	12	21		
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...		
...	...	...	...	1	1	...	1	...	1	...	1	...	...	...	...	...	...	1	...	3	3		
...	...	...	1	...	...	...	...	...	...	...	...	1	...	...	...	...	...	3	1	4	4		
...	...	1	2	3	...	...	...	...	...	...	1	...	...	...	...	...	...	3	...	8	2		
...	...	1	...	...	...	...	...	...	...	...	1	...	1	...	...	...	...	2	6	5	7		
...	...	...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	10	...	17		
...	...	...	2	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	2	...	5		
...	1	1	6	...	2	2	...	1	...	...	1	1	1	1	...	1	...	6	6	18	23		
1	2	7	3	2	2	5	7	4	2	...	2	2	2	3	1	...	...	10	13	45	45		
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...		
...	...	...	2	...	...	...	...	...	...	...	2	1	...	1	...	...	...	1	8	3	13		
1	...	...	3	...	1	1	...	...	...	...	...	...	...	...	...	...	...	1	5	4	13		
...	1	1	...	1	...	1	1	...	...	...	1	...	...	1	...	...	...	1	3	6	6		
...	...	1	2	...	1	1	...	...	...	2	3	...	1	...	...	...	...	1	3	12	10		
2	5	33	52	16	11	24	25	10	12	7	39	27	8	9	3	5	1	81	132	263	337		

TABLE VI.—(Continued).

MARCH.

	Smallpox.		Spotted (Tick) Fever.		Tuberculosis.		Diphtheria.		Scarlet Fever.		Measles.		Typhoid Fever.		Meningitis.	
	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.
Beaverhead	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Blaine	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Broadwater	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Carbon	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cascade (Excl. of)	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Great Falls	...	...	...	...	2	...	...	...	...	1	...	1	1	...	...	...
Chouteau	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...
Custer	...	...	...	...	...	...	...	...	...	...	...	3	1	...	...	...
Dawson	...	...	...	...	1	1	1	...	...	...	...	...	...	1	...	...
Deer Lodge (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Anaconda	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Fergus	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...
Flathead (Excl. of)	...	...	...	...	1	...	...	...	...	...	...	1	...	...	...	...
Kalispell	...	...	...	...	1	...	...	...	...	...	...	1	...	...	...	...
Gallatin (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bozeman	...	...	...	...	1	1	...	...	...	...	...	...	...	...	1	...
Granite	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Hill	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Jefferson	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Lewis and Clark (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Helena	...	...	...	...	3	1	...	...	...	...	...	2	...	...	...	...
Lincoln	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Madison	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
Meagher	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Missoula (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Missoula City	...	...	1	...	2	1	...	...	...	1	...	...	...	...	...	...
Musselshell	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...
Park (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...
Livingston	...	...	...	...	1	1	...	...	...	...	1	...	...	...	...	...
Powell	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ravalli	...	...	1	...	1	...	...	...	...	...	...	...	...	...	...	1
Rosebud	...	...	...	...	...	4	...	...	...	...	...	...	...	...	...	...
Sanders	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Silver Bow (Excl. of)	...	...	...	...	4	4	1	...	...	...	...	1	1	...	1	1
Butte	...	...	...	...	10	12	...	...	1	2	...	...	...	...	...	...
Sweet Grass	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Teton	...	...	...	...	...	1	...	...	...	...	1	1	...	...	...	...
Valley	...	...	...	...	...	7	...	...	...	...	...	...	...	...	...	...
Yellowstone (Excl. of)	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Billings	...	...	...	...	...	1	...	...	...	...	...	...	1	...	...	...
Totals	...	...	2	...	29	37	3	1	1	5	2	10	4	1	3	2

TABLE VI.—(Continued).

MARCH.

Whooping Cough.		Pneumonia.		Nephritis.		Organic Heart Disease.		Malignant Tumors.		Acute Intestinal Diseases.		Violence.		Suicide.		Alcoholism.		All Other Causes.		Totals.	
1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.
...	...	...	...	3	...	...	4	...	...	...	...	...	1	1	...	1	...	3	...	9	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	1	...	...	...	...	...	1	...	...	1	...	...	...	...	2	1
1	...	4	1	1	2	1	...	...	...	...	...	2	2	1	...	...	...	2	4	12	9
...	...	...	3	...	...	...	1	...	...	...	1	2	...	...	...	...	...	2	2	4	8
...	...	2	2	2	...	1	...	1	3	...	...	4	1	1	...	...	1	8	16	22	25
2	...	...	5	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	3	2	11
...	...	1	...	...	1	1	1	...	...	...	...	...	...	1	1	...	...	3	1	7	7
...	...	...	...	...	2	...	...	1	...	...	1	1	...	...	...	...	...	2	4	6	9
...	...	1	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	3	4	5
...	1	1	3	...	...	...	1	...	1	1	...	...	1	...	...	...	...	2	9	4	16
2	...	...	1	...	1	...	2	...	...	...	...	...	...	...	...	...	...	4	2	6	8
...	...	...	2	...	1	...	3	...	1	1	...	3	2	...	...	...	...	2	6	7	16
...	...	1	1	...	...	2	...	1	1	...	...	...	...	...	...	...	...	2	1	7	4
...	...	...	...	...	...	...	1	1	...	...	1	...	...	...	...	...	...	3	4	4	6
...	...	1	...	1	1	...	...	...	1	...	...	...	...	...	...	...	...	1	1	5	4
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	2	1	2
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	1	2	...	1	1	...	...	...	...	...	1	...	1	...	...	...	1	...	5	3
...	...	1	...	1	...	1	1	...	...	...	1	...	...	...	...	...	...	1	1	4	3
...	...	2	5	3	...	1	1	...	1	...	1	...	3	...	1	...	...	3	6	12	21
...	...	...	...	...	...	...	...	1	...	...	...	...	...	1	...	...	1	1	...	3	1
1	...	...	2	...	2	1	1	...	...	...	1	...	...	...	...	...	...	1	3	4	9
...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	2
...	...	1	...	...	...	...	2	1	2	...	...	1	1	...	...	1	...	1	3	5	8
...	1	3	2	...	3	2	1	...	1	1	...	1	1	...	1	...	...	8	7	18	19
...	...	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	2	...	5
...	...	2	1	1	...	...	...	...	...	...	...	1	2	...	...	...	...	1	1	6	4
...	...	...	2	...	2	1	2	...	...	...	1	...	1	...	1	...	...	3	3	6	13
...	...	...	1	...	...	...	2	1	...	...	...	...	...	...	...	...	...	2	2	3	5
...	...	...	1	...	...	1	...	...	1	...	...	...	...	...	...	1	...	1	4	5	7
...	...	...	...	...	...	1	...	...	...	...	...	1	1	...	...	...	...	...	3	2	8
...	...	...	1	...	...	...	...	...	...	...	...	2	...	1	...	...	...	...	2	3	3
...	...	...	2	2	1	3	2	2	...	...	...	5	1	...	...	1	...	3	4	23	15
1	...	7	6	2	6	4	6	3	5	1	2	6	1	1	...	1	3	17	17	53	62
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	3	3	3	4
...	1	...	...	...	...	...	1	...	...	...	...	...	2	...	...	...	...	2	3	3	9
...	...	...	4	...	1	...	...	...	...	...	2	...	2	...	...	...	...	2	2	2	18
...	...	...	...	...	...	...	...	...	1	...	...	1	1	...	...	...	...	1	6	3	8
...	1	1	1	1	1	1	1	...	...	...	1	...	2	...	...	...	...	3	9	7	17
7	4	29	51	17	25	23	37	12	18	4	12	32	26	7	7	5	5	92	139	272	380

TABLE VI.—(Continued).

APRIL.

	Smallpox.		Spotted (Tick) Fever.		Tuberculosis.		Diphtheria.		Scarlet Fever.		Measles.		Typhoid Fever.		Meningitis.	
	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.
Beaverhead	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...
Blaine	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Broadwater	...	...	...	...	...	...	...	...	3	...	...	...	...	...	...	...
Carbon	...	...	...	...	...	2	...	...	...	...	1	...	...	1	...	...
Cascade (Excl. of)	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Great Falls	...	...	...	...	1	3	...	...	...	1	...	...	...	...	...	...
Chouteau	...	...	...	...	2	2	1	1	...	...	1	2	1	...	...	...
Custer	1	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...
Dawson	...	...	...	...	...	1	...	...	...	...	...	...	...	1	...	1
Deer Lodge (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Anaconda	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...
Fergus	...	...	...	...	...	2	...	...	...	...	...	2	...	1	...	1
Flathead (Excl. of)	...	...	...	...	3	1	...	...	...	...	...	...	...	...	...	...
Kalispell	...	...	...	...	1	...	...	...	...	...	...	2	...	...	...	...
Gallatin (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bozeman	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Granite	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...
Hill	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Jefferson	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...
Lewis and Clark (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Helena	...	...	...	...	3	2	...	...	...	3	...	2	1	...	...	...
Lincoln	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Madison	...	...	...	...	1	1	...	...	...	...	...	1	...	...	...	...
Meagher	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Missoula (Excl. of)	...	...	...	...	...	5	...	...	...	...	...	...	...	...	...	...
Missoula City	...	...	2	1	1	...	...	...	...	...	...	...	1	1	...	...
Musselshell	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Park (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Livingston	...	...	...	...	2	...	...	...	...	...	...	...	1	...	...	...
Powell	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...
Ravalli	...	...	3	...	2	3	...	...	...	...	...	...	...	...	...	...
Rosebud	...	...	...	...	...	6	...	...	...	...	...	...	...	...	...	...
Sanders	...	...	...	...	...	1	...	...	...	...	1	...	...	...	...	...
Silver Bow (Excl. of)	...	...	...	...	5	6	1	...	...	...	...	...	1	...	...	1
Butte	...	...	...	...	8	10	...	...	4	...	...	...	...	...	...	1
Sweet Grass	...	...	...	...	...	...	1	...	...	...	...	...	...	1	...	...
Teton	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Valley	...	...	...	...	1	2	...	...	...	...	...	...	1	...	...	...
Yellowstone (Excl. of)	...	...	...	...	...	1	...	...	2	...	...	...	...	...	...	1
Billings	...	...	...	...	2	...	...	...	...	...	...	...	1	...	...	...
Totals	1	...	5	1	35	50	4	2	9	6	3	12	7	5	1	5

TABLE VI.—(Continued).

APRIL.

Whooping Cough.		Pneumonia.		Nephritis.		Organic Heart Disease.		Malignant Tumors.		Acute Intestinal Diseases.		Violence.		Suicide.		Alcoholism.		All Other Causes.		Totals.	
1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.
...	...	...	...	...	...	...	...	...	2	...	...	1	1	...	...	...	...	...	2	1	7
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	1	1	6	1
1	...	1	4	...	2	3	...	1	...	...	...	1	...	...	1	...	...	4	4	12	14
...	...	...	2	...	...	...	...	...	1	...	1	2	2	...	1	...	...	3	2	5	10
...	...	1	3	1	...	2	4	...	1	...	...	3	1	...	1	3	...	4	3	15	17
...	...	1	3	...	2	1	3	...	...	...	1	1	2	...	...	...	...	1	1	9	17
...	...	...	1	1	1	...	1	...	...	...	...	2	1	...	...	...	...	1	7	5	13
...	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	6	7	8	10
...	...	1	...	...	1	...	...	...	...	...	1	...	...	...	...	...	...	6	3	7	5
..	1	1	5	1	1	1	1	1	...	...	...	1	...	...	1	1	...	4	3	11	13
1	...	2	...	...	1	...	...	1	...	1	...	...	...	...	1	...	...	5	2	10	10
...	...	...	1	...	2	1	...	...	...	...	...	...	1	...	...	...	...	...	3	4	8
...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	5	2
...	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	4	1	5	2
...	...	...	1	...	...	1	1	...	...	...	...	...	1	...	...	...	...	2	1	3	5
...	...	1	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	2	1	3	3
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	1	4	1
...	...	1	1	1	1	2	1	...	...	...	1	2	1	...	...	...	...	...	1	6	6
...	...	1	1	2	...	2	3	3	...	...	2	3	1	...	1	...	...	4	3	19	18
...	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...	...	...	3	...	6	...
...	...	...	1	...	...	...	1	...	...	...	...	...	2	...	...	...	...	1	2	2	8
...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	1	1	2	2
...	...	...	1	...	...	1	...	...	...	...	...	...	2	...	...	...	...	2	1	3	9
...	...	2	1	4	...	2	2	1	5	...	...	...	2	...	1	...	...	7	5	20	18
...	...	...	...	...	...	...	1	...	...	...	...	...	5	...	1	...	...	...	...	...	7
...	...	...	...	...	...	...	1	...	1	...	...	...	2	...	...	...	...	2	2	2	6
...	...	1	...	1	1	1	...	...	...	1	1	...	...	1	...	...	...	1	3	9	5
...	...	1	3	...	...	1	2	...	...	...	...	1	...	...	...	...	...	1	1	6	6
...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	3	3	9	7
...	...	...	1	...	...	...	...	...	...	...	...	1	...	...	...	...	...	1	2	2	9
...	...	...	...	1	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	2	1
2	...	...	...	3	2	1	...	...	...	...	1	6	3	...	...	...	...	11	7	30	20
...	...	5	6	5	3	5	...	4	5	...	1	4	3	1	2	...	1	11	14	47	47
...	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	1	3	1
...	...	...	...	...	...	1	1	...	...	...	...	1	2	...	1	...	...	1	1	3	6
...	...	1	3	...	...	...	...	...	...	...	1	1	...	...	...	1	2	1	2	6	11
...	1	1	...	1	...	...	...	...	...	...	...	2	...	...	...	...	...	2	1	8	3
...	...	1	1	2	...	...	1	...	...	2	2	1	3	1	...	...	...	4	1	14	8
4	2	27	39	23	19	29	24	11	15	4	13	39	36	3	11	5	3	102	93	312	336

TABLE VI.—(Continued).

MAY.

	Smallpox.		Spotted (Tick) Fever.		Tuberculosis.		Diphtheria.		Scarlet Fever.		Measles.		Typhoid Fever.		Meningitis.	
	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.
Beaverhead	...	...	...	...	1	...	3	...	...	...	...	...	...	...	...	...
Blaine	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Broadwater	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Carbon	...	...	...	1	...	...	...	...	1	...	...	...	...	...	1	...
Cascade (Excl. of)	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...
Great Falls	...	...	...	...	3	...	...	...	...	...	...	...	...	...	...	...
Chouteau	...	...	...	...	2	1	1	2	...	...	1	...	...	...	...	...
Custer	...	...	...	...	1	...	...	...	...	...	...	...	1	1	...	...
Dawson	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Deer Lodge (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Anaconda	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...
Fergus	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...
Flathead (Excl. of)	...	...	...	...	1	1	...	...	...	...	...	...	...	1	...	...
Kalispell	...	...	...	...	1	1	...	...	...	...	...	...	1	...	...	...
Gallatin (Excl. of)	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...
Bozeman	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Granite	...	...	...	...	...	1	...	...	...	...	...	1	...	...	...	...
Hill	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Jefferson	...	...	...	...	...	...	1	...	...	...	...	...	...	1	...	...
Lewis and Clark (Excl. of)	...	...	...	...	1	...	...	...	...	...	...	...	...	1	...	...
Helena	...	...	...	...	2	3	...	...	...	1	...	...	...	1	...	...
Lincoln	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Madison	...	...	...	...	...	...	...	...	1	...	...	1	...	...	...	...
Meagher	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...
Missoula (Excl. of)	...	...	...	...	...	3	...	...	...	...	...	1	...	...	...	...
Missoula City	...	...	...	...	1	1	...	...	...	...	...	...	...	...	2	...
Musselshell	...	...	...	...	...	1	...	...	...	...	...	...	...	1	...	...
Park (Excl. of)	...	...	...	...	2	...	...	...	...	...	...	...	...	1	...	...
Livingston	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Powell	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...
Ravalli	...	...	...	3	...	...	...	...	...	...	...	2	...	...	...	...
Rosebud	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...
Sanders	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Silver Bow (Excl. of)	...	...	...	...	2	3	...	...	...	...	...	...	...	...	...	...
Butte	...	...	...	...	7	7	...	...	1	1	...	...	...	...	2	1
Sweet Grass	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Teton	...	...	...	...	...	...	...	...	1	...	1	2	...	...	1	...
Valley	...	...	...	...	...	4	...	...	...	...	...	1	...	...	...	...
Yellowstone (Excl. of)	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...
Billings	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Totals	...	...	...	4	29	33	7	4	6	3	2	11	2	6	6	1

TABLE VI.—(Continued).

MAY.

Whooping Cough.		Pneumonia.		Nephritis.		Organic Heart Disease.		Malignant Tumors.		Acute Intestinal Diseases.		Violence.		Suicide.		Alcoholism.		All Other Causes.		Totals.	
1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.
...	...	1	1	...	...	1	...	...	...	...	...	...	1	...	1	...	1	1	5	7	9
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	2	...	3
...	...	...	2	1	...	...	2	...	1	...	...	...	...	1	...	...	...	4	3	8	9
...	...	...	1	...	...	...	...	...	...	...	...	1	2	...	1	...	...	4	3	6	8
1	...	...	1	2	2	...	...	...	...	...	...	2	1	...	...	1	...	6	7	15	11
...	...	2	...	...	...	...	...	...	2	1	...	1	...	...	1	...	...	3	3	11	9
...	...	...	1	...	1	4	...	...	1	...	...	1	2	...	...	...	...	4	1	11	7
...	...	1	1	...	...	1	...	...	...	...	...	3	1	...	...	1	...	4	3	11	5
...	...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	3	8	5	8
...	2	2	2	2	1	...	...	...	...	...	...	...	2	...	...	...	...	4	7	9	15
...	...	...	...	1	1	...	...	...	...	1	...	...	2	...	...	...	1	2	5	4	10
...	...	...	1	1	...	...	1	1	...	...	...	...	4	...	...	...	...	3	3	6	11
...	...	...	...	1	1	1	...	2	...	...	...	6	...	1	...	...	...	3	1	16	3
...	...	1	...	...	2	...	...	...	...	...	...	1	1	...	...	...	...	3	1	6	5
...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	1	...	...	5	3	6	4
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	2	1	4
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	2	...	2	...	...	1	...	...	...	...	...	...	...	...	1	...	6	2
...	...	2	...	...	...	1	1	...	2	...	...	1	2	...	...	...	...	2	3	7	8
...	...	4	3	...	1	...	3	1	1	...	...	1	2	...	...	...	...	5	5	13	20
...	...	1	...	...	...	...	1	...	...	...	...	...	4	...	...	...	...	1	...	2	6
...	...	...	1	...	...	1	2	...	...	...	...	...	...	...	...	...	...	4	3	6	10
...	...	1	...	...	1	...	1	...	...	...	...	1	...	...	...	...	...	...	3	3	6
...	...	...	1	1	...	...	3	...	...	...	...	2	2	...	...	...	...	1	2	4	12
...	...	1	2	2	...	...	1	3	...	1	...	1	1	...	...	...	...	3	2	14	6
...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	4	...	...	...	...	...	7
...	...	...	1	1	...	...	...	...	...	...	...	...	1	...	...	...	...	2	1	5	5
...	...	...	1	...	...	2	...	...	...	...	...	...	...	...	...	...	...	5	3	7	4
...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	2	1	6	1
...	1	...	1	1	...	1	...	...	...	...	...	...	...	...	1	...	...	3	2	5	10
...	...	...	...	...	...	...	1	...	1	...	...	...	...	...	...	...	...	3	8	3	12
...	...	...	...	...	...	1	...	...	...	...	...	1	1	...	...	...	...	1	...	3	2
...	...	1	1	1	1	...	2	...	...	...	...	3	3	...	1	1	2	6	1	14	14
2	1	7	9	3	2	3	8	1	1	...	...	...	2	2	2	2	...	15	20	45	54
...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	1	...	3	...
...	...	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...	1	1	4	5	9
...	1	...	...	...	...	...	1	...	...	...	1	1	...	...	1	...	...	...	5	1	14
...	...	...	2	...	...	...	...	...	...	2	...	1	...	...	1	...	...	1	2	6	5
...	...	1	...	...	1	...	1	...	...	1	...	1	1	...	...	...	1	7	6	10	11
3	5	26	33	21	14	20	28	8	10	7	1	30	38	4	14	5	6	114	128	290	339

TABLE VI.—(Continued).

JUNE.

	Smallpox.		Spotted (Tick) Fever.		Tuberculosis.		Diphtheria.		Scarlet Fever.		Measles.		Typhoid Fever.		Meningitis.	
	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.
Beaverhead	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Blaine	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Broadwater	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...
Carbon	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
Cascade (Excl. of)	...	...	...	...	...	...	...	...	...	...	1	...	...	1	...	...
Great Falls	...	...	...	...	...	...	...	...	1	...	...	1	1	1	...	...
Chouteau	...	...	...	...	2	2	...	...	...	...	...	...	...	1	...	...
Custer	...	...	...	...	...	1	...	...	...	1	...	...	...	...	1	...
Dawson	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Deer Lodge (Excl. of)	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...
Anaconda	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Fergus	...	...	...	...	...	1	2	...	...	...	...	...	...	...	...	...
Flathead (Excl. of)	...	...	...	...	...	1	...	...	1	...	...	...	...	...	...	...
Kalispell	...	...	...	...	...	...	...	...	3	...	...	...	...	...	...	...
Gallatin (Excl of)	...	...	...	...	...	1	1	...	...	...	...	...	1	...	...	...
Bozeman	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Granite	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Hill	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Jefferson	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Lewis and Clark (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Helena	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1	1
Lincoln	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Madison	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Meagher	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
Missoula (Excl. of)	...	...	...	...	...	2	...	...	...	...	...	...	...	1	...	...
Missoula City	...	...	...	...	...	1	...	...	1	...	...	...	...	1	...	...
Musselshell	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Park (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...
Livingston	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...
Powell	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ravalli	...	...	2	...	...	...	...	...	...	...	...	...	1	...	...	...
Rosebud	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...
Sanders	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Silver Bow (Excl. of)	...	...	...	...	3	2	1	...	1	...	...	...	...	...	...	...
Butte	...	...	...	...	6	6	1	...	6	1	...	...	3	1	...	1
Sweet Grass	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Teton	...	...	...	...	...	1	...	...	...	...	...	2	...	1	...	...
Valley	...	...	...	...	1	2	...	...	...	...	...	...	...	...	...	...
Yellowstone (Excl. of)	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
Billings	...	...	...	...	...	2	...	1	...	...	...	...	...	...	...	...
Totals	...	...	2	...	13	29	6	1	15	2	1	3	8	7	4	3

TABLE VI.—(Continued).

JUNE.

Whooping Cough.		Pneumonia.		Nephritis.		Organic Heart Disease.		Malignant Tumors.		Acute Intestinal Diseases.		Violence.		Suicide.		Alcoholism.		All Other Causes.		Totals.	
1910.	1911.	1910	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.
...	...	...	...	...	...	1	1	...	1	...	...	2	...	...	....	....	1	2	1	6	4
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	....	....	....
...	...	...	...	...	...	...	...	1	...	...	...	...	...	1	....	....	....	....	2	4	2
1	1	1	...	1	2	1	...	...	2	...	2	2	4	...	....	1	....	1	4	9	14
...	...	...	...	...	...	...	3	1	1	...	...	...	2	...	....	....	....	5	1	7	8
...	...	1	...	...	2	1	1	1	2	2	1	1	1	...	....	1	....	12	5	21	14
...	...	1	...	2	1	...	1	...	1	2	...	1	1	...	....	....	....	2	4	10	11
...	...	...	...	...	1	2	3	...	1	...	...	1	1	...	....	....	....	....	3	4	11
...	...	1	1	1	1	2	...	...	1	...	1	...	2	...	....	1	....	2	4	7	11
...	...	...	1	...	...	...	...	1	...	...	...	1	...	...	....	....	....	8	13	10	16
...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	....	....	....	4	5	4	7
...	...	...	...	...	...	...	1	...	...	1	...	1	...	...	....	....	....	3	2	7	4
...	...	1	...	2	1	...	...	...	...	1	1	...	2	...	....	....	....	1	1	6	6
...	...	...	...	...	1	2	1	...	...	...	...	6	...	...	....	....	....	1	....	12	2
...	...	1	1	2	...	...	...	...	...	...	...	2	1	...	....	....	....	....	1	7	4
...	...	1	...	...	1	1	...	2	...	...	...	...	1	...	....	....	....	3	4	7	6
...	...	...	...	...	...	...	...	...	...	1	1	1	...	...	....	....	....	2	....	4	1
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	....	....	....
...	...	...	1	1	...	...	...	...	1	...	...	4	...	...	....	....	....	....	....	5	2
...	...	...	...	1	...	1	1	...	...	...	...	1	1	...	....	....	....	4	1	7	3
...	...	...	...	1	1	...	2	3	...	...	1	...	1	...	1	....	....	4	4	9	12
...	...	...	...	...	...	...	...	...	...	...	...	5	...	...	1	....	....	2	4	7	5
...	...	1	...	2	2	...	4	1	1	...	...	1	...	...	....	....	....	2	2	7	10
...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	....	....	1	3	....	6	1
...	...	1	1	...	...	2	...	...	...	...	...	3	3	...	....	1	....	3	....	10	7
...	...	...	...	...	...	1	3	...	2	2	...	1	...	1	....	....	....	6	1	12	8
...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	....	....	....	....	1	....	4
...	...	1	...	...	...	...	...	...	...	...	...	...	1	...	....	....	....	3	1	5	2
...	...	1	...	1	...	1	...	1	...	...	...	...	...	...	....	1	....	1	....	7	....
...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	....	1	....	2	3	3	4
...	...	...	...	...	...	1	2	1	3	...	...	2	...	...	....	....	....	....	3	7	....
...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	....	....	....	1	2	1	5
...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	....	....	....	....	....	1	....
...	...	5	1	2	1	2	...	...	2	2	...	6	3	...	....	....	....	6	6	28	15
...	...	5	2	1	2	4	1	3	3	2	...	4	3	...	5	3	1	15	9	53	36
...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	....	1	....	1	1	2	1
...	...	...	2	...	...	1	...	...	1	...	...	2	1	...	....	....	....	....	3	3	11
...	...	...	3	...	...	2	3	...	...	...	...	1	3	...	....	....	....	5	7	9	19
...	...	...	...	...	...	...	...	...	...	...	1	...	4	1	....	....	....	1	2	3	6
...	1	...	...	1	...	...	...	...	1	2	...	2	2	1	1	....	....	4	2	10	10
1	3	21	13	18	17	25	27	16	23	15	10	51	39	5	8	10	3	109	102	320	290

TABLE VI.—(Continued).

JULY.

	Smallpox.		Spotted (Tick) Fever.		Tuberculosis.		Diphtheria.		Scarlet Fever.		Measles.		Typhoid Fever.		Meningitis.	
	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.
Beaverhead	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Blaine	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Broadwater	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Carbon	...	...	...	...	1	...	1	1	...	...	...	...	...	...	...	...
Cascade (Excl. of)	...	...	...	...	...	1	1	2	...	...	...	...	...	...	...	...
Great Falls	...	...	...	...	3	...	...	...	...	...	...	...	...	1	...	...
Chouteau	...	...	...	...	2	2	...	...	1	...	...	...	...	2	...	...
Custer	...	...	...	...	2	1	...	...	1	...	1	...	...	...	...	...
Dawson	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
Deer Lodge (Excl. of)	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Anaconda	...	...	...	...	...	...	...	...	1	...	...	...	...	...	1	...
Fergus	...	...	...	...	...	1	...	...	...	...	...	...	1	...	...	...
Flathead (Excl. of)	...	...	...	...	1	1	...	...	...	...	...	...	...	...	2	...
Kalispell	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
Gallatin (Excl. of)	...	...	...	...	1	...	...	...	...	...	...	...	...	1	...	...
Bozeman	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...
Granite	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Hill	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Jefferson	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...
Lewis and Clark (Excl. of)	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Helena	...	...	...	...	...	5	...	...	...	...	...	...	...	...	2	1
Lincoln	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Madison	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Meagher	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
Missoula (Excl. of)	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
Missoula City	...	...	1	...	1	2	...	...	...	...	...	...	...	...	...	...
Musselshell	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Park (Excl. of)	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Livingston	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Powell	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Ravalli	...	...	1	...	...	...	...	...	...	1	...	...	...	1	1	...
Rosebud	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...
Sanders	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Silver Bow (Excl. of)	...	...	...	...	2	4	...	...	1	...	...	...	...	...	4	...
Butte	...	...	...	...	7	6	...	...	1	1	...	...	...	1	2	...
Sweet Grass	...	...	...	...	1	...	...	...	...	...	...	...	1	...	...	...
Teton	...	...	...	...	...	2	...	...	...	...	...	3	...	...	...	...
Valley	...	...	...	...	1	3	...	...	...	...	...	...	...	...	...	...
Yellowstone (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Billings	...	...	...	...	1	...	1	...	1	...	...	...	1	...	...	...
Totals	...	...	2	...	26	32	7	4	6	2	1	3	4	7	12	1

TABLE VI.—(Continued).

JULY.

Whooping Cough.		Pneumonia.		Nephritis.		Organic Heart Disease.		Malignant Tumors.		Acute Intestinal Diseases.		Violence.		Suicide.		Alcoholism.		All Other Causes.		Totals.	
1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.
...	...	1	1	...	...	2	...	...	...	1	...	...	1	...	....	....	1	1	2	6	5
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	....	....	....
...	...	...	...	...	...	...	...	...	...	...	...	1	3	...	....	....	....	3	....	4	3
1	...	...	...	...	...	1	2	...	...	4	1	3	1	...	....	....	....	6	3	17	8
...	...	...	...	...	...	...	...	1	...	1	2	7	...	1	....	....	....	4	....	15	5
...	...	2	1	2	1	...	2	1	3	9	2	5	2	...	1	....	....	11	7	33	20
...	...	...	...	...	1	2	2	...	1	7	...	5	3	...	1	....	....	4	2	21	14
...	...	...	...	...	...	...	...	1	...	2	2	3	1	1	1	....	....	6	4	17	9
...	...	...	...	1	...	...	...	...	...	3	4	...	2	...	....	....	....	7	4	12	10
...	...	...	...	...	...	...	...	...	...	1	...	...	1	...	....	....	....	9	1	10	3
...	...	...	...	1	...	1	...	...	1	2	...	1	...	...	....	....	....	3	3	10	4
...	...	1	...	...	...	...	1	...	...	4	1	...	3	...	....	....	....	4	1	10	7
1	...	...	...	...	3	...	1	...	...	3	...	6	3	...	....	....	....	3	2	16	10
...	...	1	...	1	...	...	...	3	1	6	...	1	...	...	....	....	....	4	3	17	4
...	...	...	...	...	...	1	1	...	...	...	...	3	1	...	....	....	1	4	1	9	5
...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	....	....	....	1	....	4	....
...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	....	....	....	2	....	2	2
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	....	....	....
...	...	1	...	1	...	1	...	...	...	1	...	6	1	...	....	....	....	1	1	11	3
1	...	1	...	...	...	...	1	...	...	...	1	1	...	...	....	....	....	2	2	6	4
...	1	...	...	1	1	1	1	...	...	1	1	1	2	...	1	....	1	5	5	11	9
...	...	...	1	...	...	...	...	...	1	...	...	2	1	...	1	....	....	2	....	4	4
...	...	...	...	1	...	...	...	1	...	...	...	1	...	...	....	....	....	3	1	6	1
...	...	...	...	...	...	...	...	...	...	1	...	...	...	1	....	....	....	....	....	3	....
...	...	...	...	...	1	...	...	1	...	...	1	3	2	...	....	....	1	1	2	6	7
...	...	1	...	...	...	4	...	3	...	2	...	2	4	2	2	....	....	5	5	21	13
...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	....	....	....	....	1	....	2
...	...	...	...	1	1	1	...	...	1	2	...	5	2	...	....	....	....	4	2	14	6
...	...	...	...	...	...	...	...	...	...	4	...	1	...	...	....	1	....	....	2	6	3
...	...	...	...	...	...	1	...	...	...	...	...	2	1	...	....	....	....	2	2	5	4
...	1	...	...	...	1	...	1	2	...	...	...	...	4	...	....	....	2	3	3	7	14
...	...	...	...	...	...	1	...	...	...	...	...	2	1	...	....	....	....	1	2	4	4
...	...	...	...	...	...	1	...	...	...	...	...	2	2	1	....	....	....	....	....	4	2
...	1	2	1	...	...	2	1	...	2	7	...	5	5	...	1	....	....	5	6	28	21
...	...	4	2	4	6	2	3	3	3	6	1	4	7	...	2	3	....	18	21	54	53
...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	....	....	....	....	....	3	1
...	...	2	...	1	...	...	1	...	...	...	...	2	...	...	2	....	....	2	4	7	12
...	...	...	...	...	...	...	...	...	...	...	2	6	2	...	....	....	....	3	1	11	10
...	1	1	2	1	...	...	1	...	...	3	...	3	1	...	....	....	....	2	2	9	5
...	...	...	...	...	1	1	...	1	...	6	4	1	3	...	3	....	....	5	1	18	12
3	4	17	8	17	16	22	19	17	13	76	22	85	61	6	15	4	6	136	96	441	306

TABLE VI.—(Continued).

AUGUST.

	Smallpox.		Spotted (Tick) Fever.		Tuberculosis.		Diphtheria.		Scarlet Fever.		Measles.		Typhoid Fever.		Meningitis.	
	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.
Beaverhead	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
Blaine	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Broadwater	...	...	...	...	...	...	...	1	...	...	...	...	...	...	1	...
Carbon	...	...	...	...	1	1	...	...	...	...	...	...	1	...	...	...
Cascade (Excl. of)	...	...	...	...	...	1	1	...	...	...	...	...	2	...	...	...
Great Falls	...	...	...	...	1	...	...	...	...	...	...	...	7	...	...	...
Chouteau	...	...	...	...	1	2	...	...	...	...	...	...	...	...	...	...
Custer	...	...	...	...	...	2	...	...	...	...	...	...	2	2	1	...
Dawson	...	...	...	...	1	...	...	...	...	...	...	...	...	2	...	...
Deer Lodge (Excl. of)	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Anaconda	...	...	...	...	...	1	1	1	...	...	...	...	1	...	...	...
Fergus	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Flathead (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	1	...	2	...
Kalispell	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Gallatin (Excl. of)	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Bozeman	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...
Granite	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...
Hill	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Jefferson	...	...	...	...	...	1	...	...	...	...	...	...	1	...	...	...
Lewis and Clark (Excl. of)	...	...	...	...	2	...	...	...	...	...	...	...	1	1	...	...
Helena	...	...	...	...	...	1	...	...	...	...	...	...	1	...	...	...
Lincoln	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Madison	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1
Meagher	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Missoula (Excl. of)	...	...	...	...	2	1	...	...	...	...	...	...	...	...	1	...
Missoula City	...	...	...	...	3	2	...	...	...	...	...	...	1	...	...	1
Musselshell	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Park (Excl. of)	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Livingston	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...
Powell	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Ravalli	...	...	...	...	3	4	...	...	...	...	...	...	1	...	...	...
Rosebud	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...
Sanders	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Silver Bow (Excl. of)	...	...	...	...	3	5	...	...	...	...	...	...	...	...	1	...
Butte	...	...	...	...	8	6	2	...	1	...	...	...	2	...	1	...
Sweet Grass	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Teton	...	...	...	...	...	4	...	...	...	...	...	...	...	1	...	...
Valley	...	...	...	...	1	1	...	...	...	...	...	...	1	1	...	...
Yellowstone (Excl. of)	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...
Billings	...	...	...	...	2	...	...	...	...	...	...	...	...	1	...	...
Totals	...	...	...	...	36	37	4	2	2	...	...	...	23	9	8	2

TABLE VI.—(Continued).

AUGUST.

Whooping Cough.		Pneumonia.		Nephritis.		Organic Heart Disease.		Malignant Tumors.		Acute Intestinal Diseases.		Violence.		Suicide.		Alcoholism.		All Other Causes.		Totals.	
1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.
...	...	1	1	...	...	...	1	...	...	...	...	...	1	1	...	...	...	2	...	5	3
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	1	...	...	...	1	...	1	...	...	...	...	1	2	...	6	2
...	...	1	1	...	...	1	...	...	...	3	...	4	...	...	...	...	...	4	6	15	8
...	...	...	...	...	...	...	...	...	...	3	4	1	3	...	1	1	...	6	1	14	10
...	...	1	1	1	2	1	1	...	...	7	2	5	1	...	...	...	1	9	8	32	16
...	...	...	...	...	...	...	1	1	...	4	1	2	...	2	...	...	...	1	3	11	7
...	...	1	1	...	...	...	...	...	...	...	4	...	1	...	1	...	...	2	5	6	16
...	...	2	...	...	...	1	1	2	...	3	1	1	1	...	...	...	...	6	3	16	8
...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	7	5	9	7
...	...	2	2	...	3	2	...	...	...	8	1	1	1	1	...	...	...	2	3	18	12
...	...	1	...	...	...	2	...	1	...	5	1	2	1	1	...	...	...	1	7	13	9
...	...	...	...	...	...	1	...	...	...	5	...	1	2	...	...	...	...	2	2	12	4
...	...	...	...	1	...	2	...	1	...	5	...	...	...	...	...	...	...	4	2	14	2
...	...	...	1	2	...	...	...	...	...	1	...	2	3	...	...	...	...	...	2	5	7
...	...	1	...	2	...	...	...	1	...	...	1	...	...	1	...	...	...	...	2	6	3
...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1	3	1
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	1	...	1	...	...	1	...	...	1	...	...	3	...	...	...	...	2	2	6	7
...	...	...	1	...	...	...	4	...	...	1	...	2	1	...	...	...	...	...	2	6	9
1	...	1	1	2	1	1	...	1	2	3	5	2	3	...	...	...	...	2	3	14	16
...	...	...	...	1	2	...	...	...	...	...	...	...	1	...	...	...	...	...	1	1	4
...	...	1	...	1	...	2	...	1	...	1	...	1	...	...	...	...	...	...	2	7	4
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1
...	...	...	...	...	...	...	...	...	1	1	...	3	2	...	...	...	...	...	1	7	5
2	...	...	1	3	...	3	2	...	2	2	1	...	1	...	...	...	...	5	2	19	12
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1
...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	3	1	4	3
...	...	...	...	...	...	...	1	2	...	2	2	1	...	...	...	...	...	1	1	7	4
...	...	...	...	2	...	...	...	...	...	...	...	...	3	...	1	...	...	3	...	6	4
2	...	1	...	...	...	...	2	2	...	3	1	...	1	1	...	...	...	4	1	17	9
...	...	...	1	...	...	...	1	...	...	...	1	1	1	...	...	...	...	...	4	1	10
...	...	...	...	...	...	...	...	...	...	2	..	3	...	...	...	...	...	...	1	5	2
...	...	...	3	...	1	4	3	...	1	13	10	4	...	...	...	...	...	4	6	29	29
2	...	2	...	6	7	5	4	3	3	9	10	6	10	4	2	3	1	14	11	68	54
...	...	...	...	...	...	...	1	...	...	2	...	1	...	...	...	...	...	2	...	5	2
...	...	...	1	3	...	...	...	...	...	...	2	3	2	1	1	...	...	...	3	7	14
...	...	...	...	...	...	...	...	...	1	2	3	...	...	...	...	...	...	2	4	6	10
...	...	1	...	...	1	...	...	...	...	4	3	1	4	2	1	...	...	5	5	15	14
...	...	...	...	...	...	2	2	...	...	2	1	1	1	...	...	...	...	3	7	10	12
7	...	18	15	25	17	28	25	15	10	94	54	49	49	14	7	4	5	98	109	425	341

TABLE VI.—(Continued).

SEPTEMBER.

	Smallpox.		Spotted (Tick) Fever.		Tuberculosis.		Diphtheria.		Scarlet Fever.		Measles.		Typhoid Fever.		Meningitis.	
	1910.	1911.	1910.	1911.	1910.	1911.	1910	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.
Beaverhead	...	...	...	...	1	...	...	...	...	...	...	...	1	...	...	...
Blaine	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Broadwater	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Carbon	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...
Cascade (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...
Great Falls	...	...	...	...	3	2	1	...	...	...	...	...	9	1	...	1
Chouteau	...	...	...	...	1	2	...	...	...	...	...	...	...	...	...	...
Custer	...	...	...	...	...	...	...	...	...	...	...	...	3	2	...	...
Dawson	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Deer Lodge (Excl. of)	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Anaconda	...	...	...	...	1	1	1	...	...	...	...	...	...	...	...	...
Fergus	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...
Flathead (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...
Kalispell	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Gallatin (Excl. of)	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1	...
Bozeman	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...
Granite	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Hill	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Jefferson	...	...	...	...	1	...	...	...	...	...	...	...	1	...	...	...
Lewis and Clark (Excl. of)	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Helena	...	...	...	...	2	1	1	...	...	...	...	...	1	...	1	...
Lincoln	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Madison	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Meagher	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Missoula (Excl. of)	...	...	...	...	...	1	...	...	...	...	...	...	1	1	...	...
Missoula City	...	...	...	...	1	2	...	...	...	...	...	...	4	1	...	1
Musselshell	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Park (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Livingston	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Powell	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ravalli	...	...	...	...	2	...	...	...	...	...	...	1	...	...	...	...
Rosebud	...	...	...	...	1	3	...	...	...	...	...	...	...	...	...	...
Sanders	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Silver Bow (Excl. of)	...	...	...	...	1	3	...	...	...	...	...	...	1	...	...	...
Butte	...	...	...	...	5	6	...	...	1	1	...	...	...	1	...	1
Sweet Grass	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Teton	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...
Valley	...	...	...	...	1	1	...	...	...	...	...	...	2	1	...	...
Yellowstone (Excl. of)	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Billings	...	...	...	...	1	2	...	...	...	...	...	...	3	1	...	...
Totals	...	...	...	...	27	26	3	...	1	1	...	3	32	10	2	3

TABLE VI.—(Continued).

SEPTEMBER.

Whooping Cough.		Pneumonia.		Nephritis.		Organic Heart Disease.		Malignant Tumors.		Acute Intestinal Diseases.		Violence.		Suicide.		Alcoholism.		All Other Causes.		Totals.	
1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.
...	...	...	1	2	...	...	1	1	...	...	...	...	...	...	...	...	...	2	4	7	6
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	1	...	1	...	3	...
...	...	1	...	...	1	1	2	1	...	1	5	1	2	...	...	1	...	7	2	14	13
...	...	1	...	...	...	...	1	...	...	1	...	2	1	...	...	...	...	3	2	9	4
...	...	2	...	1	1	2	...	1	...	5	2	1	3	...	...	...	1	9	4	34	15
...	...	...	2	...	1	...	2	...	...	1	...	1	3	...	1	...	...	2	...	5	11
...	...	1	...	...	1	1	2	...	...	...	...	1	1	...	1	1	...	6	5	13	12
...	...	...	...	2	...	1	...	1	1	4	...	2	3	...	1	...	1	4	2	14	8
...	...	...	...	...	...	1	...	1	...	...	...	2	...	...	...	...	...	6	9	11	9
...	...	2	...	1	1	3	4	1	...	...	2	1	...	...	1	...	...	4	2	14	12
...	...	...	...	2	...	1	...	...	1	3	...	1	1	1	...	1	...	1	6	10	9
...	...	...	...	...	...	...	...	2	...	1	2	5	...	...	...	...	...	4	4	14	6
...	...	...	...	1	1	...	1	...	...	...	1	1	1	...	...	...	...	3	1	6	5
...	...	...	...	...	2	...	1	2	1	...	...	...	1	1	...	1	...	1	1	6	7
...	...	...	1	1	1	...	...	...	...	...	...	...	...	...	...	...	...	1	...	3	2
...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	2
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	1	1	...	...	...	...	2	...	2	...	...	...	...	...	...	...	...	...	7	1
...	...	1	...	1	...	...	1	...	...	1	...	1	...	...	...	...	...	4	2	9	3
...	...	...	...	3	2	1	3	3	2	...	1	2	...	2	...	...	...	2	6	18	15
2	...	...	1	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	2	3
...	...	...	1	...	1	2	...	...	2	...	...	1	1	...	...	...	...	3	4	7	9
...	...	...	...	...	...	...	...	...	...	1	...	...	2	...	...	...	...	1	1	3	3
...	...	...	1	...	...	1	...	...	...	...	...	3	1	1	...	1	...	4	3	11	7
...	...	5	...	1	2	1	2	1	...	1	3	2	3	1	...	...	...	2	3	19	17
...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	1	...	2
...	...	...	...	...	...	1	...	...	...	...	1	1	...	...	...	...	...	2	2	4	3
...	...	...	...	...	...	...	1	...	...	...	...	1	...	...	...	...	...	2	1	3	4
...	...	...	...	...	...	...	1	...	...	...	...	1	1	...	...	...	...	1	1	2	3
...	...	...	...	1	...	1	...	1	...	1	...	...	1	...	...	...	...	3	5	9	7
...	...	...	1	...	...	...	1	...	...	...	...	1	...	...	...	...	...	1	7	3	12
...	...	...	...	...	...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	2	...
...	...	4	...	1	3	4	1	...	...	1	...	3	8	...	1	...	...	4	4	19	20
...	...	4	3	4	2	1	5	2	...	8	5	7	9	...	2	...	2	20	14	52	51
...	...	1	...	...	...	...	1	...	...	1	...	...	...	...	...	...	...	...	1	2	2
...	...	2	...	1	...	...	2	...	...	...	...	...	1	...	...	...	...	2	6	5	11
...	...	1	...	...	...	...	...	...	1	2	6	2	1	...	...	...	...	3	5	11	15
...	...	1	...	...	...	...	2	...	...	2	.	4	3	...	...	...	...	4	4	11	10
...	...	3	...	...	...	...	...	...	...	..	1	1	2	...	...	...	...	4	5	12	11
2	...	30	14	22	19	23	34	19	9	38	29	48	50	6	9	6	4	116	117	375	328

TABLE VI.—(Continued).

OCTOBER.

	Smallpox.		Spotted (Tick) Fever.		Tuberculosis.		Diphtheria.		Scarlet Fever.		Measles.		Typhoid Fever.		Meningitis.	
	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.
Beaverhead	...	...	...	...	...	1	...	...	...	1	...	...	...	...	...	...
Blaine	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Broadwater	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Carbon	...	...	...	...	...	1	...	...	...	...	...	...	...	1	...	...
Cascade (Excl. of)	...	...	...	...	2	...	...	...	...	...	1	...	2	...	...	...
Great Falls	...	...	...	...	...	3	...	...	...	...	...	...	6	1	...	...
Chouteau	...	...	...	...	1	...	...	...	...	...	...	...	3	...	...	...
Custer	...	...	...	...	...	...	...	...	...	1	...	...	1	1	...	...
Dawson	...	...	...	...	...	...	...	...	...	...	...	1	...	...	2	...
Deer Lodge (Excl. of)	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...
Anaconda	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Fergus	...	...	...	...	...	1	...	...	...	...	1	...	4	...	1	...
Flathead (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...
Kalispell	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	1
Gallatin (Excl. of)	...	...	...	...	...	2	...	...	...	...	...	...	2	3	1	...
Bozeman	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...
Granite	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...
Hill	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Jefferson	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Lewis and Clark (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Helena	...	...	...	...	1	1	...	...	...	...	...	...	1	1	...	...
Lincoln	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Madison	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Meagher	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Missoula (Excl. of)	...	...	...	...	1	4	...	...	...	...	...	...	...	...	...	...
Missoula City	...	...	...	...	...	1	...	...	...	...	...	...	5	...	...	...
Musselshell	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Park (Excl. of)	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
Livingston	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1
Powell	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Ravalli	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Rosebud	...	...	...	...	...	4	...	...	...	...	...	...	...	...	...	...
Sanders	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Silver Bow (Excl. of)	...	...	...	...	5	4	...	...	...	...	...	...	...	...	...	...
Butte	...	...	...	...	6	7	...	1	...	...	...	...	1	2	1	...
Sweet Grass	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Teton	...	...	...	...	1	1	...	...	...	...	...	...	2	...	...	...
Valley	...	...	...	...	1	1	...	...	...	...	...	...	1	...	...	...
Yellowstone (Excl. of)	...	...	...	...	1	...	...	...	...	...	...	...	...	1	...	1
Billings	...	...	...	...	...	1	...	...	...	...	...	...	3	2	...	...
Totals	...	...	...	...	21	40	2	1	...	2	2	1	34	14	5	3

TABLE VI.—(Continued).

OCTOBER.

Whooping Cough.		Pneumonia.		Nephritis.		Organic Heart Disease.		Malignant Tumors.		Acute Intestinal Diseases.		Violence.		Suicide.		Alcoholism.		All Other Causes.		Totals.	
1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910	1911.
...	...	...	...	...	1	...	...	...	...	...	...	1	...	...	1	...	....	1	1	2	5
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	....
...	...	...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	....	2	2	2	4
...	...	1	...	...	1	...	...	...	...	1	2	...	...	...	...	...	....	2	2	5	8
...	...	...	...	...	1	1	...	...	...	1	...	...	1	...	...	...	....	....	4	7	6
...	1	...	4	1	...	1	1	...	...	...	...	...	2	...	...	1	....	5	5	14	17
...	...	...	...	...	...	...	...	...	...	1	...	2	1	...	...	...	....	5	7	12	8
...	...	1	...	1	1	1	...	...	...	...	...	2	3	...	1	...	....	1	2	7	9
...	1	...	...	1	...	1	...	...	...	...	...	1	1	...	...	...	....	3	2	8	5
...	...	...	...	...	...	...	...	1	...	...	...	1	...	...	...	...	....	6	12	9	13
...	...	2	...	...	...	...	...	2	...	...	1	1	...	...	...	1	....	2	3	8	4
...	...	...	1	...	...	...	...	1	...	...	...	1	...	1	...	...	1	1	7	10	10
...	...	2	1	1	...	3	...	...	...	2	...	2	3	...	...	1	....	5	3	18	7
...	...	...	...	...	...	...	1	1	2	1	...	1	...	...	...	...	1	....	3	4	9
...	...	1	2	2	...	...	...	...	...	2	1	1	3	...	...	...	....	5	2	14	13
...	...	...	2	...	...	1	1	...	...	...	...	...	...	...	...	...	....	....	3	1	8
...	...	...	...	...	...	...	...	...	...	1	...	...	...	1	...	...	....	....	1	3	2
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	....
...	...	...	...	...	1	...	...	...	...	...	...	...	1	...	1	...	....	1	1	1	4
...	...	...	...	...	...	1	1	...	...	...	...	4	1	1	...	...	....	2	3	8	5
...	...	4	1	1	1	2	2	...	...	...	...	1	1	...	...	...	....	7	3	17	10
...	...	1	...	...	1	...	...	...	1	...	...	...	...	...	...	...	....	....	....	1	2
...	...	...	...	...	...	...	1	...	...	1	2	2	...	...	...	...	....	2	4	5	8
...	...	...	...	...	...	...	1	...	...	...	...	...	2	...	...	...	....	....	....	....	3
...	...	...	...	...	...	...	1	...	...	...	2	3	2	1	...	1	....	1	6	7	15
...	...	...	...	5	1	2	3	1	1	...	2	2	1	1	1	...	....	6	4	22	14
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	....
...	...	...	...	...	...	1	...	1	...	...	...	...	...	...	...	...	....	1	....	4	....
...	...	...	...	...	...	1	...	...	...	...	...	...	1	...	...	...	....	2	1	3	4
...	...	1	...	...	...	...	1	...	1	...	...	3	...	...	...	...	....	....	....	4	3
...	...	...	...	...	...	2	...	1	...	...	...	...	1	1	...	...	....	4	3	9	4
...	...	...	...	...	...	...	...	...	...	...	...	1	2	...	...	...	....	2	2	3	8
...	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	....	1	1	2	3
...	...	6	...	1	1	3	2	...	1	1	...	1	3	...	...	1	....	4	3	22	14
...	...	2	7	1	...	6	6	1	1	2	3	6	1	1	2	3	....	11	19	41	49
...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	....	....	2	....	3
...	...	...	...	...	1	...	1	1	1	...	...	...	...	...	...	...	....	2	2	6	6
...	...	...	1	...	2	...	1	...	1	...	1	1	1	...	...	...	1	1	....	4	9
...	...	...	...	...	...	1	...	...	...	...	1	2	...	1	1	...	....	2	1	7	5
...	...	1	2	1	1	...	3	...	...	1	...	...	...	...	...	...	....	6	8	12	17
...	2	22	22	15	13	27	28	11	9	14	15	39	32	8	7	8	3	93	122	302	314

TABLE VI.—(Continued).

NOVEMBER.

	Smallpox.		Spotted (Tick) Fever.		Tuberculosis.		Diphtheria.		Scarlet Fever.		Measles.		Typhoid Fever.		Meningitis.	
	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.
Beaverhead	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...
Blaine	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Broadwater	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Carbon	...	...	...	...	...	1	...	2	...	...	...	...	2	...	...	...
Cascade (Excl. of)	...	...	...	...	1	...	...	...	...	...	1	...	...	...	...	...
Great Falls	...	...	...	...	1	1	...	...	...	...	...	...	2	1	...	...
Chouteau	...	...	...	...	...	...	...	...	...	...	1	...	1	1	...	...
Custer	...	...	...	...	...	1	...	...	...	...	...	...	1	...	...	...
Dawson	...	...	...	...	1	...	1	1	...	...	...	...	...	...	...	...
Deer Lodge (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Anaconda	...	...	...	...	...	...	3	...	...	...	...	...	...	...	...	...
Fergus	...	...	...	...	1	1	1	...	...	...	...	...	3	...	...	...
Flathead (Excl. of)	...	...	...	...	1	...	...	...	...	...	...	...	2	...	...	...
Kalispell	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...
Gallatin (Excl. of)	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Bozeman	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Granite	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Hill	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Jefferson	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Lewis and Clark (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Helena	...	...	...	...	3	1	...	...	...	...	...	...	...	...	...	...
Lincoln	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Madison	...	...	...	...	3	...	...	...	...	1	...	...	...	...	...	1
Meagher	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Missoula (Excl. of)	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Missoula City	...	...	...	...	1	2	...	...	...	...	...	...	1	...	...	...
Musselshell	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Park (Excl. of)	...	...	...	...	1	...	...	...	1	...	...	...	...	...	...	...
Livingston	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Powell	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Ravalli	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
Rosebud	...	...	...	...	...	4	...	...	...	...	...	...	1	...	...	...
Sanders	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Silver Bow (Excl. of)	...	...	...	...	3	3	...	...	...	...	...	...	...	...	...	...
Butte	...	...	...	...	7	4	...	...	1	1	...	...	2	...	1	2
Sweet Grass	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Teton	...	...	...	...	...	1	...	...	...	...	...	...	1	...	...	...
Valley	...	...	...	...	...	2	...	1	...	...	...	...	2	1	...	...
Yellowstone (Excl. of)	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Billings	...	...	...	...	...	...	...	...	...	...	...	...	2	1	...	...
Totals	...	...	...	1	25	24	5	4	3	2	2	...	21	5	1	3

TABLE VI.—(Continued).

NOVEMBER.

Whooping Cough.		Pneumonia.		Nephritis.		Organic Heart Disease.		Malignant Tumors.		Acute Intestinal Diseases.		Violence.		Suicide.		Alcoholism.		All Other Causes.		Totals.	
1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.
...	...	...	...	1	...	1	...	...	1	...	...	...	...	1	...	...	...	...	...	5	1
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..
...	...	...	...	1	...	...	1	...	...	...	...	3	1	...	...	...	...	3	...	7	2
...	...	2	1	1	...	...	2	...	1	...	...	3	4	...	...	...	...	2	3	10	14
...	...	1	2	...	...	...	.	1	...	...	...	2	1	...	...	...	...	3	2	9	5
...	...	1	...	...	1	...	2	...	...	...	...	2	1	...	1	1	...	8	9	15	16
...	...	1	1	3	...	1	...	...	...	...	...	3	1	1	...	...	...	2	2	13	5
...	...	1	1	...	...	1	...	1	...	...	...	1	2	...	...	...	...	4	2	9	6
...	...	...	1	1	1	...	1	...	...	...	...	1	...	...	...	...	...	1	5	5	9
...	...	1	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...	4	10	7	10
...	...	1	1	1	4	1	1	...	...	1	...	1	...	1	...	...	...	6	1	15	7
...	...	1	1	2	...	1	...	...	...	...	...	1	2	...	1	2	...	5	5	17	10
...	...	2	1	2	...	2	...	...	...	...	...	2	1	...	1	...	...	3	...	14	3
...	...	...	1	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...	2	2	5
...	...	1	...	...	1	...	2	1	1	...	...	1	1	...	...	...	...	1	2	4	8
...	...	...	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	2	2	4	2
...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	2	...	3
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	7	1	...	...	...	3	2	4	9
...	...	...	...	1	...	1	2	...	...	...	...	...	2	...	...	...	...	3	...	5	4
...	...	1	...	...	2	1	2	4	1	...	...	..	1	1	...	...	...	9	6	19	13
...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	2	...	3	1
...	...	...	1	...	...	...	...	2	1	...	...	...	...	...	...	...	...	1	3	6	7
...	...	...	...	...	...	...	1	...	...	...	...	1	...	...	...	...	...	...	1	1	2
...	...	...	...	...	...	...	1	...	...	...	...	4	4	...	...	...	...	1	4	5	10
...	...	2	...	1	...	...	1	...	...	1	..	1	...	...	1	...	...	1	4	8	8
...	...	...	...	...	...	...	...	...	...	...	1	...	3	...	...	...	...	...	1	...	5
...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	1	1	3	2
...	...	1	...	...	...	...	1	1	...	...	1	...	1	...	...	...	...	2	3	4	6
...	...	...	...	1	...	1	1	...	...	...	...	...	...	...	...	...	...	...	2	3	3
...	...	...	...	...	...	2	2	...	...	...	...	1	1	...	...	...	...	2	2	5	6
...	...	...	1	...	...	1	.	...	...	...	...	...	...	...	...	...	...	...	5	2	10
...	...	1	...	...	...	...	.	...	...	...	...	...	1	...	...	...	...	...	1	1	2
...	...	3	1	5	3	2	1	...	1	...	...	4	7	...	...	1	...	5	4	23	20
...	...	6	11	2	3	4	5	5	3	2	1	4	4	1	2	2	1	26	9	52	46
...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...	2	1	3
...	...	...	...	1	...	...	...	...	...	...	...	. .	1	...	...	...	...	1	4	4	6
...	...	2	1	1	1	...	2	...	1	...	...	...	...	...	...	...	...	1	2	6	11
...	...	2	1	...	...	...	...	...	...	...	...	2	2	3	...	...	...	6	...	14	3
...	...	3	...	1	...	1	1	1	...	...	1	...	...	...	1	1	...	3	7	12	11
...	...	33	26	27	16	22	30	16	10	4	4	39	51	11	7	7	1	101	110	317	294

TABLE VI.—(Continued).

DECEMBER.

	Smallpox.		Spotted (Tick) Fever.		Tuberculosis.		Diphtheria.		Scarlet Fever.		Measles.		Typhoid Fever.		Meningitis.	
	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.
Beaverhead	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...
Blaine	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Broadwater	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Carbon	...	...	...	...	1	...	...	1	1	...	...	...	...	...	...	...
Cascade (Excl. of)	...	...	...	...	...	...	...	...	...	...	1	...	...	1	...	...
Great Falls	...	...	...	...	1	3	...	...	1	...	1	...	2	...	...	...
Chouteau	...	...	...	...	1	...	1	...	...	...	...	...	...	...	...	...
Custer	...	...	...	...	1	...	...	...	...	...	...	...	1	1	...	...
Dawson	...	...	...	...	1	...	1	1	...	1	...	...	...	1	...	...
Deer Lodge (Excl. of)	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Anaconda	1	...	...	...	1	1	1	...	...	...	...	...	...	...	...	...
Fergus	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
Flathead (Excl. of)	...	...	...	...	2	3	...	...	...	...	...	...	...	...	...	...
Kalispell	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...
Gallatin (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bozeman	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Granite	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Hill	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Jefferson	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...
Lewis and Clark (Excl. of)	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...
Helena	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...
Lincoln	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Madison	...	...	...	...	1	...	...	1	...	...	...	...	...	...	...	...
Meagher	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Missoula (Excl. of)	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1
Missoula City	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...
Musselshell	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Park (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Livingston	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Powell	...	...	...	...	...	...	...	...	...	1	...	...	...	1	...	...
Ravalli	...	...	...	...	2	2	1	...	...	...	...	...	...	...	...	...
Rosebud	...	...	...	...	...	3	...	...	...	...	...	...	...	...	...	...
Sanders	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Silver Bow (Excl. of)	...	...	...	...	5	3	2	1	1	2	...	...	...	...	...	...
Butte	...	...	...	...	10	10	...	...	...	...	1	...	2	1	1	1
Sweet Grass	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...
Teton	...	...	...	...	...	1	...	...	...	...	...	1	...	...	...	1
Valley	...	...	...	...	2	...	...	...	...	...	...	...	2	...	...	...
Yellowstone (Excl. of)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...
Billings	...	...	...	...	1	4	...	...	...	...	...	...	...	...	...	...
Totals	1	...	...	...	36	34	6	4	4	5	3	1	8	5	5	3

TABLE VI.—(Continued).

DECEMBER.

Whooping Cough.		Pneumonia.		Nephritis.		Organic Heart Disease.		Malignant Tumors.		Acute Intestinal Diseases.		Violence.		Suicide.		Alcoholism.		All Other Causes.		Totals.	
1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.
...	...	...	...	...	...	1	...	...	...	1	...	1	...	...	...	...	1	2	...	6	1
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	2	3	4	3
...	...	3	1	...	...	1	1	...	...	...	...	2	1	...	...	...	...	4	5	12	9
...	...	2	...	1	...	...	...	...	1	...	...	1	5	...	1	...	...	4	...	9	8
...	...	1	...	...	2	...	1	...	1	...	...	...	1	...	1	...	1	9	7	15	17
...	...	3	2	1	...	...	...	2	...	1	...	...	2	...	...	...	...	9	4	18	8
...	...	3	...	...	1	2	...	...	...	1	...	...	3	...	1	...	...	1	1	9	7
...	...	1	...	1	...	1	...	2	...	1	...	...	1	...	1	1	...	6	3	15	8
...	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	7	8	10	8
...	...	5	4	...	1	...	1	...	1	...	...	...	...	1	...	...	...	6	3	15	11
...	...	2	1	1	2	1	...	...	...	...	...	4	3	...	1	1	...	3	5	12	13
...	...	1	1	1	...	2	...	...	...	...	...	...	...	...	...	...	...	4	1	10	5
...	...	...	...	1	1	2	...	...	...	...	...	...	...	...	...	...	...	...	3	5	4
...	...	1	2	...	...	...	...	...	...	...	2	...	3	...	...	...	...	...	1	1	8
...	...	...	1	4	1	1	1	...	...	...	...	...	...	...	...	...	...	2	2	7	5
...	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	3	1	5	1
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	1	...	...	...	2	...	...	...	...	...	...	1	...	...	1	...	2	...	6	3
...	...	1	...	1	1	1	2	...	1	...	...	...	...	...	...	...	...	1	2	5	7
...	...	1	...	1	1	1	1	2	...	...	...	1	1	...	...	...	...	6	4	14	7
...	...	...	...	...	1	...	...	...	1	...	...	1	1	1	...	...	...	3	2	6	5
...	...	...	...	...	1	1	1	...	...	...	1	...	...	...	...	...	...	1	1	3	5
...	...	...	3	...	...	...	...	...	...	...	...	1	...	...	...	...	...	1	2	2	5
...	...	2	2	...	...	...	...	...	...	...	...	2	1	...	1	1	1	...	2	5	9
...	...	4	1	...	1	1	2	1	1	1	...	3	...	...	1	...	1	8	9	20	16
...	...	...	...	...	1	...	...	...	...	...	...	...	1	...	...	...	...	...	4	...	7
...	...	3	1	1	...	...	...	...	...	...	1	2	...	...	...	...	...	2	...	8	2
...	...	2	...	1	...	...	1	...	...	...	...	...	2	...	1	...	...	5	2	8	6
...	...	...	...	...	...	2	1	...	...	1	...	...	1	...	...	...	...	2	1	5	5
1	...	1	...	...	...	1	2	...	1	...	1	1	1	...	...	...	...	2	2	9	9
...	...	...	1	...	...	...	1	...	...	...	...	...	1	...	...	...	...	1	2	1	8
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1
...	...	4	...	...	...	3	3	...	...	...	...	1	1	1	...	...	...	4	8	21	18
...	...	14	4	1	4	4	6	1	6	1	...	3	8	...	1	1	3	6	25	45	69
...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1
...	...	2	3	...	1	...	1	...	...	2	...	...	1	...	1	...	...	1	2	5	12
...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	1	...	2	1	7	3
...	...	1	2	...	...	...	1	...	...	1	...	4	...	...	...	...	...	1	2	8	5
...	...	1	1	1	1	2	2	1	...	...	...	2	2	...	...	...	1	7	2	15	13
1	...	61	32	17	21	30	28	9	4	10	5	30	41	3	10	6	8	117	121	347	332

TABLE VI.—(Continued).

TOTALS.

	Smallpox.		Spotted (Tick) Fever.		Tuberculosis.		Diphtheria.		Scarlet Fever.		Measles.		Typhoid Fever.		Meningitis.	
	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.
Beaverhead	...	...	...	...	6	1	3	...	3	3	...	...	2	...	...	...
Blaine	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Broadwater	...	...	...	...	1	...	...	1	4	...	...	...	...	...	3	1
Carbon	...	...	...	1	5	5	2	4	2	...	1	...	4	5	1	1
Cascade (Excl. of)	...	...	...	...	3	5	3	3	...	...	4	...	6	2	...	...
Great Falls	...	...	...	...	18	13	5	...	2	3	1	2	28	5	...	1
Chouteau	...	...	...	...	16	11	3	4	1	...	3	2	5	5	...	...
Custer	1	...	...	...	5	6	1	...	2	2	1	5	10	7	2	...
Dawson	...	...	...	...	5	4	4	3	...	1	...	1	...	5	3	2
Deer Lodge (Excl. of)	...	...	...	...	3	4	1	...	...	...	...	...	...	...	...	...
Anaconda	1	...	...	...	4	5	8	3	1	...	...	...	1	...	1	...
Fergus	...	...	...	...	1	9	3	...	...	4	1	2	8	3	2	1
Flathead (Excl. of)	...	...	...	...	9	9	...	...	2	...	...	2	7	1	4	...
Kalispell	...	...	...	...	7	1	1	...	3	...	...	3	3	2	2	1
Gallatin (Excl. of)	...	...	...	...	3	10	1	...	...	2	...	3	3	4	2	...
Bozeman	...	...	...	...	1	5	...	...	...	...	...	...	2	...	2	...
Granite	...	...	...	...	4	3	...	...	...	...	...	2	...	...	...	...
Hill	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Jefferson	...	...	...	...	3	3	1	...	...	...	...	1	2	2	...	1
Lewis and Clark (Excl. of)	...	...	...	...	6	...	...	...	1	1	...	...	1	1	1	1
Helena	...	...	...	...	17	20	1	...	2	4	...	4	6	3	6	5
Lincoln	...	...	...	...	1	2	...	...	...	...	...	...	...	...	...	...
Madison	...	...	...	...	7	4	2	1	1	1	...	5	...	1	...	2
Meagher	...	...	...	...	2	1	1	...	1	...	...	...	...	...	...	...
Missoula (Excl. of)	...	...	...	...	5	22	1	...	...	...	...	1	1	2	1	1
Missoula City	...	...	4	1	14	14	...	...	1	1	...	2	13	4	4	2
Musselshell	...	...	...	...	...	2	...	...	...	1	...	...	...	1	...	...
Park (Excl. of)	...	...	...	...	7	2	1	...	1	...	...	...	1	1	1	...
Livingston	...	...	...	...	3	3	...	1	...	...	1	...	3	...	1	1
Powell	...	...	...	...	5	2	...	...	...	1	...	...	...	1	1	...
Ravalli	...	...	7	4	12	9	1	1	...	1	...	3	2	1	1	2
Rosebud	...	...	...	...	2	35	...	2	...	...	...	...	1	...	...	...
Sanders	...	...	...	...	...	3	...	...	...	...	1	...	...	...	...	...
Silver Bow (Excl. of)	...	...	...	...	46	49	6	1	4	3	...	1	3	...	6	2
Butte	...	...	...	...	93	96	5	2	19	7	1	1	10	8	10	12
Sweet Grass	...	...	...	...	3	1	1	...	...	...	...	...	1	...	1	...
Teton	...	...	...	...	1	14	...	...	1	...	2	11	3	2	1	1
Valley	...	...	...	...	10	32	...	2	...	...	...	1	9	3	...	1
Yellowstone (Excl. of)	...	...	...	...	6	2	1	1	5	...	...	...	...	3	1	1
Billings	...	...	...	...	9	13	5	1	1	1	...	...	12	8	...	...
Totals	2	...	11	6	343	420	61	30	57	35	16	52	147	80	57	39

TABLE VI.—(Continued).

TOTALS.

Whooping Cough.		Pneumonia.		Nephritis.		Organic Heart Disease.		Malignant Tumors.		Acute Intestinal Diseases.		Violence.		Suicide.		Alcoholism.		All Other Causes.		Totals.	
1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.
...	...	6	7	9	1	8	8	2	5	2	...	5	7	3	3	1	4	17	20	67	59
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	....	....	....
...	...	2	2	1	...	3	2	1	1	2	1	7	13	1	1	1	1	14	12	40	35
4	1	21	17	5	8	10	12	3	4	10	9	21	16	3	1	2	....	41	48	135	132
...	...	4	14	2	1	3	8	4	4	6	9	20	17	1	4	1	....	42	26	99	93
1	1	16	18	10	12	11	19	5	14	24	8	27	17	2	4	7	5	98	89	255	211
2	...	9	19	6	8	6	12	3	4	18	2	29	14	4	3	....	1	31	37	126	122
...	...	8	5	2	8	12	8	2	4	3	6	13	16	2	6	1	....	31	37	96	110
...	1	7	8	7	4	7	2	7	2	11	9	13	12	...	3	3	1	43	42	110	100
...	...	7	5	2	1	3	1	3	...	1	1	4	1	1	1	....	2	69	81	94	97
...	5	24	21	8	14	9	10	4	4	13	4	9	5	3	2	3	....	51	51	140	124
4	...	10	7	6	7	5	6	3	1	15	2	11	15	3	3	4	2	37	49	113	111
1	...	7	10	7	8	9	8	3	3	13	3	24	25	...	1	1	....	28	30	115	100
...	...	4	3	8	4	9	5	9	4	12	1	17	2	2	....	....	1	28	16	105	43
...	...	9	9	6	7	1	5	6	3	3	7	10	15	1	....	1	1	24	21	70	86
...	...	4	7	13	4	7	4	3	1	1	1	...	2	1	1	....	....	24	20	58	45
...	...	3	2	1	...	...	2	...	1	4	1	2	1	1	....	....	....	12	10	27	22
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	....	....	....
...	...	7	5	5	2	10	2	2	2	4	...	12	13	2	1	1	1	13	11	62	44
1	...	7	4	6	2	10	16	1	3	2	3	19	9	1	....	....	....	21	18	77	58
1	1	16	13	18	12	16	22	20	10	4	12	13	16	4	4	....	1	59	56	183	183
2	...	2	2	1	4	2	1	1	3	...	...	11	8	2	4	....	2	17	7	39	33
1	...	5	10	5	6	9	13	5	4	2	4	11	3	...	....	....	....	21	31	69	85
...	...	3	5	1	2	3	5	...	...	2	...	4	7	2	....	....	1	6	10	25	31
...	...	4	11	1	1	4	8	2	3	1	4	26	24	2	2	5	2	18	31	71	112
2	3	21	14	18	9	19	21	11	13	11	6	18	16	7	7	1	2	60	52	204	167
...	...	...	1	...	1	...	1	...	1	...	3	...	13	...	5	....	....	....	11	....	40
...	...	7	4	7	2	4	2	1	3	2	2	10	12	...	....	....	....	24	12	66	40
...	...	5	4	4	3	6	6	5	...	7	5	3	6	1	2	2	....	26	22	67	53
...	...	3	9	8	...	6	8	1	2	3	...	9	8	...	1	1	....	19	15	56	47
3	1	5	5	2	3	11	10	7	6	4	2	6	9	3	1	2	2	30	37	96	98
...	...	1	9	...	...	3	6	...	1	...	1	8	8	...	....	....	....	10	49	25	111
..	...	1	3	1	...	3	2	2	...	3	2	8	4	2	1	....	....	2	9	23	24
2	2	28	20	18	16	28	17	3	7	25	13	40	40	2	5	4	3	66	60	281	238
8	3	66	61	33	37	46	60	30	35	32	26	49	51	12	27	20	14	168	195	602	635
...	...	2	4	...	2	...	3	...	...	3	...	5	3	1	1	1	....	8	13	26	27
...	1	6	10	6	2	3	8	1	2	2	2	12	12	1	6	....	1	14	14	53	116
1	1	5	23	1	6	3	8	...	4	4	18	12	10	...	1	2	3	22	37	69	150
...	3	7	15	3	1	3	5	...	1	12	4	25	16	7	4	1	....	30	29	101	75
...	2	12	10	8	8	12	13	4	1	15	13	15	16	4	5	3	2	51	56	151	149
33	26	354	386	239	206	304	349	154	156	276	184	518	482	81	109	68	52	1275	1339	3996	4006

TABLE NO VII.

DEATHS FROM ALL CAUSES REPORTED TO THE STATE BOARD OF HEALT
CAUSE OF DE

Sex.	M	F	M	F	M	F	M	F	M	F	M
Age.	Under 1 Year		1 to 2		2 to 3		3 to 4		4 to 5		5to
I.											
GENERAL DISEASES.											
Typhoid Fever	1	...	1	...	...	1	3	...	1	...	3
Small Pox	2	...	...	...	...	...	...	...	...	...	...
Measles	1	1	3	1	1	1	...	1	...	...	1
Scarlet Fever	1	...	4	3	4	2	2	3	...	5	14
Whooping Cough	14	6	6	4	...	...	...	...	...	1	1
Diphtheria	...	1	2	4	3	2	4	3	3	2	11
Croup	...	...	...	...	...	...	...	...	...	...	...
Grippe (Influenza)	...	...	...	...	...	...	...	...	...	...	1
Spotted (Tick) Fever	...	...	...	...	...	...	...	...	...	...	...
Erysipelas	5	3	...	...	...	...	...	...	...	...	...
Septicaemia	1	2	...	1	...	...	...	1	...	...	1
Tubercle of the Lungs	2	...	3	1	...	...	...	2	...	...	...
Tubercle of Meninges	1	...	1	1	3	1	...	1	...	...	2
Tubercle of Peritoneum	...	1	...	1	...	...	...	...	...	...	1
Other Tuberculoses	3	...	2	1	...	...	...	...	...	...	...
Syphilis	...	1	...	1	...	...	...	...	...	...	...
Cancer of Stomach and Liver	...	...	...	...	...	...	...	...	...	...	...
Cancer of Peritoneum and Intestines.	...	...	...	...	...	...	...	...	...	...	...
Cancer of Female Genital Organs	...	...	...	...	...	...	...	...	...	...	...
Cancer of Breast	...	...	...	...	...	...	...	...	...	...	...
Cancer of Skin	...	...	...	...	...	...	...	...	...	...	...
Cancer of Organs not Specified	...	...	...	...	...	...	...	...	...	...	...
Other Tumors	...	...	...	...	...	...	...	...	...	...	...
Rheumatism, Acute Articular	...	...	...	...	...	...	...	...	...	...	2
Rheumatism, Chronic and Gout	...	...	...	...	...	...	...	...	...	...	...
Diabetes	...	...	...	...	1	...	...	...	...	...	2
Anaemia and Chlorosis	...	...	...	...	...	...	...	...	...	...	...
Alcoholism, Acute and Chronic	...	...	...	...	...	...	...	...	...	...	...
Chronic Poisonings	...	...	...	...	...	...	...	...	...	...	...
Goitre	...	...	...	...	...	...	...	...	...	...	...
II.											
DISEASES OF THE NERVOUS SYSTEM AND ORGANS OF SPECIAL SENSE.											
Encephalitis	...	2	...	...	1	...	...	...	...	...	...
Meningitis, Simple	9	1	1	1	...	...	2	1	...	...	2
Meningitis, Cerebro Spinal	8	2	1	2	1	...	1	3	2	...	3
Cerebro Congestion and Hemorrhage	...	...	...	...	...	...	...	...	...	...	...
Cerebral Softening	...	...	...	...	...	...	...	...	...	...	...
Paralysis	...	...	...	...	...	...	...	...	...	...	...
General Paralysis of Insane	...	...	...	...	...	...	...	...	...	...	...
Other forms of Mental Alienation	...	...	...	...	...	...	...	...	...	...	1
Epilepsy	...	...	...	...	...	...	...	...	...	...	...
Convulsions of Children	4	2	2	...	...	...	...	...	...	...	...
Chorea	...	...	...	...	...	...	...	...	...	...	...
Tetanus	...	1	...	...	...	...	...	...	...	...	1
Other Diseases ot Nervous System	3	2	2	...	...	3	...	...	1	...	1
Diseases of Ear and Adenexa	1	...	...	...	...	...	...	...	...	...	1
Anterior Polio Myelitis	1	...	...	...	...	...	...	...	1	...	...

TABLE NO. VII.

H FOR THE YEAR ENDING DECEMBER 31, 1910, ARRANGED ACCORDING TO
ATH, AGE AND SEX.

F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
10	10to15		15to20		20to30		30to40		40to50		50to60		60to70		70 to 80		Over 80		Total		Grand Total.
3	2	1	6	6	52	7	33	7	6	5	6	1	...	...	...	...	1	1	115	32	147
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	2
...	...	...	1	1	...	...	...	...	...	1	...	...	...	...	...	...	...	...	7	9	16
8	2	2	1	3	1	1	1	...	...	...	...	...	...	...	...	...	...	...	30	27	57
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	21	12	33
11	1	5	2	2	2	...	1	2	...	...	...	...	...	...	...	...	...	...	29	32	61
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	1	...	...	...	...	...	...	...	1	1	2	...	...	1	1	...	...	...	6	2	8
1	1	...	2	...	2	1	1	...	...	1	2	...	...	...	...	...	...	...	8	3	11
...	...	...	...	...	1	1	...	1	2	...	1	...	...	1	...	1	1	...	10	7	17
...	...	...	...	1	4	1	4	...	4	...	5	...	2	...	2	...	2	...	25	6	31
2	1	3	4	4	43	29	57	16	63	8	34	8	13	7	3	1	1	...	224	81	305
1	...	1	2	...	1	1	...	...	1	1	...	...	...	...	...	...	...	...	11	7	18
1	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	2	4	6
...	...	...	...	...	2	...	1	...	...	...	3	...	2	...	...	...	...	...	13	1	14
...	...	...	...	...	...	...	1	1	...	...	1	...	...	...	...	...	...	...	2	3	5
...	...	...	...	...	...	...	1	2	8	8	10	5	9	11	8	6	1	1	37	33	70
...	...	...	...	...	...	2	1	1	1	...	3	2	2	...	2	1	...	...	9	6	15
...	...	...	...	...	...	3	...	6	...	6	...	3	...	2	...	...	...	...	...	20	20
...	...	...	...	...	...	2	...	1	...	3	...	3	...	1	...	2	...	1	...	13	13
...	...	...	...	...	...	...	...	...	1	...	...	...	2	1	2	...	2	...	7	1	8
...	1	...	...	...	1	...	1	2	2	2	6	...	5	2	4	...	...	2	20	8	28
...	...	...	...	...	...	1	...	1	...	1	...	...	...	...	...	...	...	...	...	3	3
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	2
...	...	...	...	...	...	...	1	...	...	...	2	1	1	1	1	1	...	1	5	4	9
1	1	1	4	2	1	...	1	...	9	1	6	...	5	2	...	2	...	...	30	9	39
...	...	...	...	...	...	3	...	...	...	1	1	1	1	1	...	...	...	...	2	9	11
...	...	...	...	...	7	1	16	1	12	2	15	1	11	...	2	...	...	...	63	5	68
...	...	...	...	...	1	2	3	1	1	...	...	1	...	...	...	...	...	...	5	4	9
...	...	...	...	...	...	2	1	...	1	1	...	...	...	...	...	...	...	...	2	3	5
...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	2	2	4
1	2	...	2	1	2	1	1	...	1	...	...	...	1	...	...	...	...	...	23	6	29
3	...	...	1	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	18	10	28
...	...	...	1	...	4	1	4	...	12	3	17	7	12	17	14	9	7	4	71	41	112
...	...	...	...	...	...	...	1	...	1	2	2	...	2	2	2	...	1	...	9	4	13
...	...	...	...	...	...	...	1	...	1	2	1	...	1	3	5	2	6	2	15	9	24
...	...	...	1	1	...	1	12	5	12	2	6	...	5	...	2	3	1	1	39	13	52
...	...	...	...	1	...	...	1	1	3	1	1	...	1	...	3	...	1	...	11	3	14
...	2	1	1	...	...	1	1	...	...	1	1	...	1	...	...	...	...	...	6	3	9
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	6	2	8
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	1	4
...	2	2	2	3	3	1	1	...	3	...	1	...	2	1	1	...	...	...	22	12	34
2	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	3	5
...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	5	...	5

TABLE VII—(Continued)

Sex.	M	F	M	F	M	F	M	F	M	F	M
Age.	Under 1 Year		1 to 2		2 to 3		3 to 4		4 to 5		5to
III.											
DISEASES OF [illegible] Y SYSTEM.											
Pericarditis	...	....	....	....	...	...	...	...	...	...	...
Endocarditis	...	2	1	2	...	...	...	1	...	...	10
Other Diseases of Heart	...	....	....	1	...	...	...	...	...	...	...
Diseases of Arteries (Atheroma, Aneurism)	...	....	....	....	...	...	...	...	...	...	...
Angina Pectoris	...	....	....	....	...	...	...	...	...	...	...
Embolism and Thrombosis	...	....	....	....	...	...	...	...	...	...	...
Diseases of Lymphatic System	...	....	1	....	...	...	...	...	...	...	...
Hemorrhages	...	....	....	....	...	...	...	...	...	...	...
IV.											
DISEASES OF RESPIRATORY SYSTEM.											
Diseases of Larnyx	...	1	1	1	...	...	...	...	...	...	1
Bronchitis, Acute	9	11	1	3	...	...	...	...	...	...	...
Bronchitis, Chronic	...	....	....	....	...	...	...	...	...	...	...
Pneumonia	40	33	10	12	6	6	1	3	2	3	6
Pleurisy	...	....	....	....	...	...	...	...	...	...	...
Asthma	...	....	....	....	...	...	...	...	...	...	...
Pulmonary Emphysema	...	....	....	....	...	...	...	...	...	...	...
Empyema	...	....	1	....	...	...	...	...	...	...	...
V.											
DISEASES OF DIGESTIVE SYSTEM.											
Tonsolitis	...	....	....	....	...	...	...	...	...	...	...
Ulcer of Stomach	...	....	....	....	...	...	...	...	...	...	...
Other Diseases of Stomach	...	....	....	....	...	...	...	...	...	...	...
Diarrhoea and Enteritis under 2	110	85	25	19	...	...	...	...	...	...	...
Diarrhoea and Enteritis, Chronic	...	....	....	....	...	...	...	...	...	...	...
Diarrhoea and Enteritis over 2	...	....	....	....	3	5	5	3	3	3	1
Hernia and Intestinal Obstruction	3	7	1	....	1	...	1	...	...	...	...
Cirrhosis of Liver	...	....	....	....	...	...	...	...	...	...	...
Biliary Calculi	...	....	....	....	...	...	...	...	...	...	...
Other Diseases of Liver	...	....	....	....	...	...	...	...	...	...	...
Diseases of Spleen	...	....	....	....	...	...	...	...	...	...	...
Appendicitis and Abscess of Iliac Fosse	...	....	1	....	...	1	...	1	2	...	3
Peritonitis, Simple	2	1	....	....	...	...	...	1	...	...	1
VI.											
DISEASES OF GENITO URINARY SYSTEM AND ADENEXA.											
Nephritis, Acute	5	3	....	....	...	1	...	...	...	1	1
Brights Disease	...	....	...	....	...	...	...	...	...	...	...
Disease of the Bladder	...	....	....	....	...	...	...	...	...	...	...
Disease of the Prostate	...	....	....	....	...	...	...	...	...	...	...

TABLE VII—(Continued)

10	10to15		15to20		20to30		30to40		40to50		50to60		60to70		70 to 80		Over 80 to 80		Total		Grand Total.
F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
...	...	...	...	...	...	...	1	...	...	...	1	...	...	...	....	....	....	....	2	....	2
6	7	10	4	5	15	10	14	5	16	11	30	9	27	11	27	14	5	3	156	92	248
...	1	...	...	...	1	1	1	4	7	1	5	1	7	3	2	2	1	1	25	14	39
...	...	...	...	...	...	...	...	...	1	...	2	...	5	1	3	....	4	....	15	1	16
...	...	...	...	...	...	...	2	...	1	...	4	...	2	2	2	1	....	1	11	4	15
...	...	...	...	...	...	...	...	...	1	...	2	...	...	...	....	....	....	1	3	1	4
...	...	...	...	...	2	...	1	1	...	1	1	1	...	...	....	....	....	....	4	3	7
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	....	....	....	1	....	1
...	...	...	...	...	1	...	1	...	...	...	...	...	...	...	....	....	....	....	4	2	6
...	...	...	...	...	...	...	1	1	...	1	...	...	...	...	1	2	....	....	12	18	30
...	...	...	...	...	...	...	1	...	...	...	4	...	1	3	1	4	....	1	7	8	15
4	2	3	4	3	20	11	19	3	36	10	33	6	23	11	24	11	6	3	232	122	354
...	...	...	...	1	...	...	...	...	1	...	...	...	...	...	1	....	....	....	2	1	3
...	...	...	...	...	...	...	...	...	1	...	3	1	1	...	4	....	....	1	9	2	11
...	...	...	...	...	...	...	...	...	...	...	3	...	2	...	....	....	....	....	7	....	7
...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	....	....	....	....	....	....	....
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	....	....	....
...	...	...	...	...	...	1	1	...	1	1	...	1	...	...	....	1	....	....	3	4	7
...	...	...	...	...	...	...	...	1	3	2	1	...	...	...	3	....	....	1	7	4	11
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	135	104	239
...	...	...	...	...	...	...	...	...	1	2	...	...	1	...	....	2	....	....	2	4	6
...	...	1	1	...	...	...	1	1	3	1	...	1	...	1	1	....	2	1	20	17	37
1	1	...	...	...	6	2	...	...	4	4	3	1	4	3	3	1	1	....	28	19	47
...	...	...	1	...	1	...	4	2	11	3	9	1	1	2	2	2	1	....	30	10	40
...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	....	....	....	....	....	1	1
...	...	...	...	...	...	...	2	1	2	3	1	2	2	...	1	3	....	....	8	9	17
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	....	....	....
5	2	1	7	4	10	8	8	5	4	2	2	3	1	1	....	....	....	....	40	31	71
1	...	1	...	...	1	2	1	9	2	5	4	...	...	...	1	....	....	....	12	20	32
...	...	1	...	2	3	4	3	4	2	...	...	...	1	...	....	....	1	....	16	16	32
1	...	...	3	2	8	5	6	11	24	20	31	11	33	9	28	6	8	1	141	66	207
...	...	...	...	...	...	...	...	1	1	...	2	...	2	...	....	....	2	....	7	1	8
...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	....	....	....	2	....	2

TABLE VII—(Continued)

Sex.	M	F	M	F	M	F	M	F	M	F	M
Age.	Under 1	1	1 to 2		2 to 3		3 to 4		4 to 5		5to
VII.											
THE PUERPERAL STATE.											
Accidents of Pregnancy	...	...	...	...	...	...	...	...	...	...	...
Accidents of Labor	...	...	...	...	...	...	...	...	...	...	...
Septicaemia, Puerperal	...	...	...	...	...	...	...	...	...	...	...
Albuminuria and Eclampsia	...	...	...	...	...	...	...	...	...	...	...
VIII.											
DISEASE OF SKIN AND CELLULAR TISSUES.											
Gangrene	...	...	...	...	...	...	...	...	...	...	...
Carbuncle	...	...	...	...	...	...	...	...	...	...	...
IX.											
EARLY INFANCY.											
Congenital Debility, Icterus and Scleroma.	145	153	...	...	...	...	...	...	...	...	...
X.											
OLD AGE.											
Senility	...	...	...	...	...	...	...	...	...	...	...
XI.											
EFFECTIONS PRODUCED BY EXTERNAL CAUSES.											
Suicide by Poisons.	...	...	...	...	...	...	...	...	...	...	...
Suicide by Hanging and Strangulation	...	...	...	...	...	...	...	...	...	...	...
Suicide by Drowning	...	...	...	...	...	...	...	...	...	...	...
Suicide by Firearms	...	...	1	...	...	...	...	...	...	...	...
Suicide by Cutting Instruments	...	...	...	...	...	...	...	...	...	...	...
Other Suicides	...	...	...	...	...	...	...	...	...	...	...
Accidents with Firearms	...	...	...	...	...	...	...	...	...	...	4
Railroad Accidents	...	...	...	...	...	...	2	...	...	...	...
Accidents with Horses and Vehicles	...	...	...	...	...	...	...	...	...	1	1
Mine Accidents	...	...	...	...	...	...	...	...	...	...	...
Other Accidental Traumatisms	...	1	...	1	...	1	...	...	...	1	2
Burns and Scalds	...	...	...	...	1	3	...	...	...	...	...
Isolation and Freezing	.1	...	...	...	...	...	...	...	...	...	...
Electrical (Other than Lightning)	...	...	...	...	...	...	...	...	...	...	...
Lightning	...	...	...	...	...	...	...	...	...	...	...
Accidental Drowning	...	...	1	2	2	2	1	...	1	1	3
Accidental Poisoning	...	...	2	...	...	...	...	...	...	1	...
Homicide	1	...	...	...	...	...	...	...	...	...	...
Legal Execution	...	...	...	...	...	...	...	...	...	...	...
Mill Accidents	...	...	...	...	...	...	...	...	...	...	...
Auto Accidents	...	1	...	...	...	...	...	...	...	...	...
Caisson Disease	...	...	...	...	...	...	...	...	...	...	...
XII.											
DEATHS FROM ILL-DEFINED CAUSES AND STILL BIRTHS.											
Unspecified and Ill-Defined	2	7	3	1	...	...	1	3	...	...	3
Still-births	148	110	...	...	...	...	...	...	...	...	...
Totals	523	443	76	64	27	29	23	27	17	19	85

TABLE VII—(Continued)

F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
10	10to15		15to20		20to30		30to40		40to50		50to60		60to70		70 to 80		Over 80		Total		Grand Total
...	...	...	...	...	...	3	...	3	...	...	...	...	...	...	...	...	...	...	....	6	6
...	...	...	...	1	...	8	...	7	...	3	...	...	...	...	...	...	...	...	....	19	19
...	...	...	...	5	...	15	...	11	...	...	...	...	...	...	...	...	...	...	....	31	31
...	...	...	...	...	...	3	...	2	...	1	..	...	...	...	...	...	...	...	....	6	6
...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	2	....	2
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	145	153	298
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	....	22	12	23	12	35
...	...	...	1	1	6	5	8	1	7	...	4	...	...	...	...	...	...	...	26	7	33
...	...	...	...	...	1	...	2	1	1	...	1	...	1	...	1	...	...	...	7	1	8
...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1	....	1
...	...	...	...	...	7	...	4	...	6	...	10	...	3	...	2	...	...	...	32	....	32
...	...	...	...	...	1	...	1	...	1	...	1	1	...	...	1	...	...	...	5	1	6
...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	1	....	1
...	6	...	2	...	7	...	4	...	3	...	3	...	3	...	...	...	...	...	32	1	33
1	...	...	5	1	54	...	34	1	21	...	9	...	1	...	1	...	...	...	127	3	130
1	4	...	3	...	5	1	7	1	13	...	5	...	3	...	3	...	...	...	44	4	48
...	...	...	...	...	32	...	27	...	12	...	5	...	1	...	1	...	...	...	78	....	78
...	2	...	4	...	22	1	17	...	9	1	3	...	6	...	4	1	1	...	70	7	77
4	...	...	...	1	3	2	2	...	1	...	...	...	...	...	...	...	...	...	7	10	17
...	1	...	1	...	2	...	2	...	...	...	1	...	1	...	1	...	...	...	11	....	11
...	1	.	1	...	2	...	5	...	2	...	...	...	...	...	...	...	...	...	11	....	11
...	...	...	4	...	2	...	...	...	1	...	...	...	...	...	...	...	...	...	7	....	7
...	3	...	4	...	13	1	8	...	3	...	1	...	3	...	1	...	...	...	44	6	50
...	...	...	...	...	1	2	3	1	1	...	...	...	1	...	...	...	...	...	8	4	12
...	1	1	1	...	7	1	9	...	6	2	6	...	1	...	1	...	...	...	33	4	37
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....
...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	2	....	2
...	...	...	...	...	...	...	2	1	...	...	1	...	...	...	...	...	...	...	3	2	5
...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	1	....	1
2	...	...	1	1	8	2	3	4	7	5	18	1	9	3	18	9	1	....	74	38	112
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	148	110	258
60	49	35	78	52	371	150	353	131	365	130	336	73	227	106	193	88	79	39	2802	1452	4254

TABLE VIII.—DEATHS FROM ALL CAUSES REPORTED TO THE STATE BOA
ACCORDING TO CAUSE

Sex.	M	F	M	F	M	F	M	F	M	F	M
Age.	Under 1 Year		1 to 2		2 to 3		3 to 4		4 to 5		5to
I.											
GENERAL DISEASES.											
Typhoid Fever	...	...	...	...	...	...	...	...	...	...	4
Small Pox	...	...	...	...	...	...	...	...	...	...	...
Measles	5	4	6	5	4	2	3	3	1	...	3
Scarlet Fever	1	1	2	1	...	2	3	4	3	...	4
Whooping Cough	8	8	3	2	1	...	1	...	...	1	1
Diphtheria	...	1	2	1	...	1	4	4	...	...	5
Croup	...	...	...	...	...	...	...	...	...	...	...
Grippe (Influenza)	...	...	...	...	...	...	...	...	...	...	...
Spotted (Tick) Fever	...	...	...	1	...	...	...	...	...	...	...
Erysipelas	2	...	...	...	...	1	...	...	...	...	...
Septicaemia	1	1	...	...	...	1	1	...	...	...	...
Tubercle of the Lungs	7	4	4	3	5	3	4	2	1	3	1
Tubercle of Meninges	1	4	2	...	3	2	...	1	...	...	1
Tubercle of Peritoneum	...	...	1	...	1	...	...	1	...	1	...
Other Tuberculoses	...	...	...	...	...	...	1	...	...	1	2
Syphilis	1	1	1	...	...	...	...	...	...	...	...
Cancer of Stomach and Liver	...	...	...	...	...	...	...	...	...	...	...
Cancer of Peritoneum and Intestines	...	...	...	...	...	...	...	...	...	...	...
Cancer of Female Genital Organs	...	...	...	...	...	...	...	...	...	...	...
Cancer of Breast	...	...	...	...	...	...	...	...	...	...	...
Cancer of Skin	...	...	...	...	...	...	...	...	...	...	...
Cancer of Organs not Specified	...	...	...	...	...	...	...	...	...	...	1
Other Tumors	...	...	...	...	...	1	...	...	...	...	...
Rheumatism, Acute Articular	...	...	...	...	...	...	...	...	...	...	...
Rheumatism, Chronic and Gout	...	...	...	...	...	...	...	...	...	...	...
Diabetes	...	...	...	...	...	1	...	...	...	...	3
Anaemia and Chlorosis	...	...	...	...	...	...	...	...	...	...	...
Alcoholism, Acute and Chronic	...	...	...	...	...	...	...	...	...	...	...
Chronic Poisonings	...	...	...	...	...	...	...	...	...	...	...
Goitre	...	...	...	...	...	...	...	...	...	...	...
II.											
DISEASES OF THE NERVOUS SYSTEM AND ORGANS OF SPECIAL SENSE.											
Encephalitis	...	...	1	...	...	...	...	...	...	...	...
Meningitis, Simple	4	...	...	1	...	...	...	...	1	...	...
Meningitis, Cerebro Spinal	1	4	5	2	2	1	1	...	1	...	...
Cerebro Congestion and Hemorrhage	...	...	...	...	...	...	...	...	...	...	...
Cerebral Softening	...	...	...	...	...	...	...	...	...	...	...
Paralysis	...	...	...	...	...	...	...	...	...	...	...
General Paralysis of Insane	...	...	...	...	...	...	...	...	...	...	...
Other Forms of Mental Alienation	...	...	...	...	...	...	...	...	...	...	...
Epilepsy	...	...	...	...	...	...	...	...	...	...	...
Convulsions of Children	4	2	...	...	...	...	...	...	...	...	...
Chorea	...	...	...	...	...	...	...	...	...	...	1
Tetanus	...	...	...	...	...	...	...	...	...	...	...
Other Diseases of Nervous System	1	1	...	1	...	...	...	...	...	...	...
Diseases of Ear and Adenexa	1	1	2	...	...	...	...	...	...	...	...
Anterior Polio Myelitis	...	1	...	...	...	1	1	...	...	...	...

RD OF HEALTH FOR THE YEAR ENDING DECEMBER 31, 1911, ARRANGED
OF DEATH, AGE AND SEX.

F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	Grand Total.
10	10to15		15to20		20to30		30to40		40to50		50t o60		60to70		70 to 80		Over 80		Total		
3	2	3	3	4	23	7	11	2	9	...	5	1	2	...	1	....	....	....	60	20	80
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	....	....	....
6	2	1	3	...	1	1	...	1	...	1	...	...	...	...	....	....	....	....	28	24	52
4	1	5	...	...	...	2	1	1	...	...	...	...	...	...	....	....	....	....	15	20	35
1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	14	12	26
4	3	2	1	...	1	...	...	...	...	1	...	...	...	...	....	....	....	....	16	14	30
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	....	....	....
...	...	...	...	...	...	...	...	...	...	...	...	1	1	1	6	....	1	2	8	4	12
2	...	...	...	...	1	...	...	...	1	...	1	...	...	...	....	....	....	....	3	3	6
...	...	...	...	...	1	...	1	...	2	...	...	...	1	2	1	....	1	....	9	3	12
...	...	...	...	...	1	...	1	...	7	1	3	1	1	...	....	....	....	1	15	5	20
4	5	8	7	7	38	30	61	19	75	6	35	6	15	5	5	4	....	3	263	107	370
..	1	...	...	...	1	...	...	...	...	...	...	...	...	...	....	....	....	....	9	7	16
1	...	...	...	2	1	3	3	...	...	...	2	...	...	...	1	....	....	....	9	8	17
...	...	1	...	2	2	1	3	1	2	...	...	...	...	...	1	....	....	....	11	6	17
...	...	...	...	...	...	...	3	2	1	...	2	...	1	...	....	1	....	....	9	4	13
...	...	...	...	...	...	...	4	1	4	3	13	9	10	6	10	3	1	1	42	23	65
...	...	...	...	...	...	...	3	...	3	...	2	4	2	4	5	1	....	1	15	10	25
...	...	...	...	...	...	...	...	3	...	6	...	2	...	1	....	1	....	1	....	14	14
...	...	...	...	...	...	...	...	2	...	4	...	5	...	2	....	1	....	....	....	14	14
...	...	...	...	...	1	...	...	1	...	...	1	...	2	2	3	....	1	....	8	3	11
...	...	...	...	...	1	...	...	1	6	3	7	2	5	...	1	....	....	....	21	6	27
...	...	...	...	...	...	1	...	1	...	2	1	...	1	...	1	....	....	....	3	5	8
...	...	1	...	...	...	2	...	...	...	...	1	. .	...	1	....	....	....	....	1	4	5
...	...	...	...	...	...	...	...	3	...	...	2	2	1	1	....	....	....	....	3	6	9
...	...	...	1	...	5	...	3	3	3	1	5	3	1	1	6	2	1	....	28	11	39
...	...	...	...	1	...	...	1	1	2	1	2	...	...	...	....	....	....	....	5	3	8
...	...	...	...	...	2	3	9	2	16	1	13	...	2	...	4	....	....	....	46	6	52
...	...	...	...	...	2	...	2	1	3	...	1	...	...	...	2	....	....	....	10	1	11
...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	....	....	....	1	1	2	3
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	1	....	1
...	...	...	...	2	...	...	1	...	...	2	1	2	...	...	....	....	....	....	7	7	14
3	1	1	1	...	...	...	1	...	...	1	...	...	...	...	....	....	....	....	13	12	25
...	...	...	...	...	3	...	8	1	12	6	16	9	20	8	25	9	4	1	88	34	122
...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	....	....	1	....	1	1	2
...	...	...	...	...	...	...	1	...	1	...	2	2	2	3	9	1	2	2	17	8	25
...	...	...	...	...	6	1	6	3	10	2	13	3	5	...	8	....	3	....	51	9	60
...	...	...	...	...	...	...	...	...	1	...	2	...	...	1	....	....	....	....	3	1	4
...	...	...	2	...	3	1	1	...	3	...	...	1	2	...	....	....	....	....	11	2	13
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	4	2	6
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	1	....	1
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	....	....	....
1	1	...	...	...	...	1	3	...	2	1	3	2	1	3	1	....	....	....	12	10	22
1	...	...	...	...	2	...	2	...	3	...	...	...	2	...	....	....	....	....	12	2	14
1	...	...	...	1	...	...	1	...	...	...	...	...	...	...	....	....	....	....	2	4	6

TABLE VIII.—Continued.

Sex.	M	F	M	F	M	F	M	F	M	F	M
Age.	Under 1 Year		1 to 2		2 to 3		3 to 4		4 to 5		5to
III.											
DISEASES OF CIRCULATORY SYSTEM.											
Pericarditis											
Endocarditis		1				1	1	1	2		6
Other Diseases of Heart	1										
Diseases of Arteries (Atheroma, Aneurism)											
Angina Pectoris											
Embolism and Thrombosis											
Diseases of Lymphatic System		1							1		
Hemorrhages											
IV.											
DISEASES OF RESPIRATORY SYSTEM.											
Diseases of Larynx				1							
Bronchitis, Acute	2	6	1	1		2					
Bronchitis, Chronic											
Pneumonia	57	37	10	9	4	2	4	3	1	2	3
Pleurisy				1							
Asthma											
Pulmonary Emphysema											
Empyema											
Other Diseases of Respiratory System											
V.											
DISEASES OF DIGESTIVE SYSTEM.											
Tonsolitis											
Ulcer of Stomach											
Other Diseases of Stomach											
Diarrhoea and Enteritis under 2	68	51	19	10							
Diarrhoea and Enteritis, Chronic	1	1									
Diarrhoea and Enteritis over 2					7	8	2		4		1
Hernia and Intestinal Obstruction	8	4		2				1		1	
Cirrhosis of Liver											
Biliary Calculi											
Other Diseases of Liver											
Diseases of Spleen											
Appendicitis and Abscess of Iliac Fosse		1					2		2		5
Peritonitis, Simple	1										1
VI.											
DISEASES OF GENITO URINARY SYSTEM AND ADENEXA.											
Nephritis, Acute	2	1	1	1	1						3
Brights Disease		1							1		
Disease of the Bladder											
Disease of the Prostate											
Disease of the Ovaries and Tubes											

TABLE VIII.—Continued.

F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
10	10to15		15to20		20to30		30to40		40to50		50to60		60to70		70 to 80		Over 80		Total		Grand Total.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	....	....	....
7	5	5	4	5	14	10	13	12	23	15	38	17	35	14	22	8	10	1	173	97	270
1	...	1	...	2	2	3	6	2	7	1	8	7	11	3	7	3	2	1	44	24	68
...	...	...	...	1	...	...	1	1	2	...	2	...	3	1	12	1	4	....	24	4	28
...	...	...	...	...	1	1	...	2	...	1	2	1	2	1	....	....	....	....	5	6	11
...	...	...	...	...	...	1	...	1	...	1	...	...	2	...	....	....	....	....	2	3	5
...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	2	1	3
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	....	....	....
...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	....	....	....	....	....	2	2
1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	2	2	1	5	13	18
...	...	...	...	...	...	...	2	...	1	1	1	1	2	1	1	2	1	1	8	6	14
3	2	4	6	4	15	6	31	6	39	4	38	9	21	13	25	9	12	7	268	118	386
...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	1	....	....	....	2	1	3
...	...	...	...	...	...	...	...	1	1	...	1	1	1	1	1	1	....	....	4	4	8
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	....	....	....
...	...	...	1	...	...	...	...	...	2	1	1	...	...	...	....	....	....	....	4	1	5
...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	....	....	....	....	1	....	1
...	...	...	...	...	...	...	...	1	...	...	...	...	...	1	....	....	....	....	....	2	2
...	...	...	...	...	2	...	3	1	7	2	...	...	...	...	2	....	....	....	14	3	17
...	...	...	...	...	...	...	...	...	...	1	1	...	1	2	....	2	....	1	2	6	8
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	....	87	61	148
...	...	...	...	...	...	...	...	...	...	...	1	...	2	...	....	....	....	....	4	1	5
1	...	...	...	...	1	...	1	1	1	...	...	1	...	1	4	2	....	1	21	15	36
...	2	1	1	...	2	2	2	3	3	3	3	4	2	1	1	1	....	....	24	23	47
...	...	...	...	...	1	...	5	3	10	5	9	1	4	1	3	3	....	....	32	13	45
...	...	...	...	...	...	...	...	...	1	...	...	1	...	...	....	....	....	....	1	1	2
...	...	...	1	...	...	1	1	2	4	1	1	2	...	2	1	....	....	....	8	8	16
...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	....	....	....	....	1	....	1
5	2	7	4	5	11	9	6	3	6	4	2	2	1	...	2	....	....	....	43	36	79
...	2	...	2	...	1	7	2	5	2	1	1	...	...	...	1	2	....	....	13	15	28
1	...	2	1	1	3	...	1	2	2	1	2	1	2	2	2	....	....	....	20	12	32
1	1	2	1	1	9	6	5	6	19	8	30	13	17	9	21	9	11	3	115	59	174
...	...	...	...	...	...	...	1	...	1	...	...	...	...	...	2	....	1	....	5	....	5
...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	4	....	4	....	11	....	11
...	...	...	...	1	...	1	...	3	...	1	...	1	...	...	....	....	....	....	....	7	7

TABLE VIII.—Continued.

Sex.	M	F	M	F	M	F	M	F	M	F	M
Age.	Under 1 Year		1 to 2		2 to 3		3 to 4		4 to 5		5to
VII.											
THE PUERPERAL STATE.											
Accident of Pregnancy	...	...	...	...	...	...	...	...	...	...	...
Accidents of Labor	...	...	...	...	...	...	...	...	...	...	...
Septicaemia, Puerperal	...	...	...	...	...	...	...	...	...	...	...
Albuminuria and Eclampsia	...	...	...	...	...	...	...	...	...	...	...
VIII.											
DISEASE OF SKIN AND CELLULAR TISSUES.											
Gangrene	...	...	...	...	...	...	...	...	...	...	...
Carbuncle	...	...	...	...	...	...	...	...	...	...	...
IX.											
EARLY INFANCY.											
Congenital Debility, Icterus and Sclerom	206	164	...	...	...	...	...	...	...	...	...
X.											
OLD AGE.											
Senility	...	...	...	...	...	...	...	...	...	...	...
XI.											
EFFECTIONS PRODUCED BY EXTERNAL CAUSES.											
Suicide by Poisons	...	...	...	...	...	...	...	...	...	...	...
Suicide by Hanging and Strangulation	...	...	...	...	...	...	...	...	...	...	...
Suicide by Drowning	...	...	...	...	...	...	...	...	...	...	...
Suicide by Firearms	...	...	...	...	...	...	...	...	...	...	...
Suicide by Cutting Instruments	...	...	...	...	...	...	...	...	...	...	...
Other Suicides	...	...	...	...	...	...	...	...	..	...	...
Accidents with Firearms	...	...	...	...	...	2	...	...	...	...	1
Railroad Accidents	...	...	...	...	...	...	...	...	...	...	...
Accidents with Horses and Vehicles	...	...	...	1	...	...	...	...	1	...	2
Mine Accidents	...	...	...	...	...	...	...	...	...	...	...
Other Accidental Traumatisms	4	3	...	2	...	...	1	...	...	1	3
Burns and Scalds	...	...	...	...	2	...	2	1	...	...	...
Isolation and Freezing	...	...	...	...	...	...	...	...	...	...	...
Electrical (Other than Lightning)	...	...	...	...	...	...	...	...	...	...	...
Lightning	...	...	...	...	...	...	...	...	...	...	2
Accidental Drowning	...	1	1	1	5	...	2	1	1	...	1
Accidental Poisoning	...	...	2	1	...	1	...	...	...	...	1
Homicide	1	...	1	...	...	...	...	...	...	...	...
Legal Execution	...	...	...	...	...	...	...	...	...	...	...
Mill Accidents	...	...	...	...	...	...	...	...	...	...	...
Auto Accidents	...	...	...	...	...	...	...	...	...	...	...
Snake Bite	...	...	...	...	1	...	...	...	...	...	...
XII.											
DEATHS FROM ILL-DEFINED CAUSES AND STILL-DEATHS.											
Unspecified and Ill-Defined	8	13	3	4	...	2	...	...	3	1	2
Still-Births	172	103	...	...	...	...	...	...	...	...	...
Totals	568	421	67	51	36	34	33	22	23	11	57

TABLE VIII.—Continued.

F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
10	10to15		15to20		20to30		30to40		40to50		50to60		60to70		70 to 80		Over 80		Total		Grand Total.
...	...	...	...	...	...	5	...	6	...	...	...	...	...	...	...	...	...	...	...	11	11
...	...	...	...	2	...	7	...	11	...	1	...	...	...	...	...	...	...	...	...	21	21
...	...	...	...	1	...	17	...	16	...	1	...	...	...	...	...	...	...	...	...	35	35
...	...	...	...	2	...	3	...	4	...	...	...	...	...	...	...	...	...	...	...	9	9
...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	1	3	...	4	1	5
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	206	164	370
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	24	17	24	17	41
...	...	...	...	2	5	4	5	2	9	...	1	...	1	...	1	...	1	...	23	8	31
...	...	...	...	...	2	...	...	1	2	...	2	...	...	...	...	...	...	...	6	1	7
...	...	...	...	...	1	...	2	...	2	...	...	...	2	...	...	...	...	...	7	...	7
...	...	...	...	1	8	...	18	2	13	...	8	...	2	...	...	...	1	...	50	3	53
...	...	...	...	...	1	...	2	...	1	...	3	...	2	...	...	...	...	...	9	...	9
...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	1	1	2
...	...	...	5	...	2	...	3	...	1	...	2	...	...	...	...	...	...	...	14	2	16
1	1	...	3	1	28	...	25	...	23	...	10	1	5	...	1	1	1	...	97	4	101
...	1	...	...	...	7	...	14	1	8	1	5	...	2	...	...	1	1	...	41	4	45
...	1	...	3	...	24	...	21	...	14	...	7	...	...	...	...	...	...	...	70	...	70
1	2	...	3	...	6	1	23	...	8	...	6	...	2	...	...	...	2	2	60	10	70
2	...	1	...	...	1	2	2	...	4	1	1	1	4	...	...	...	...	...	16	8	24
...	...	...	...	...	2	...	2	...	3	...	1	...	5	...	2	...	1	...	16	.:..	16
...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	2	...	2
...	2	...	...	...	2	...	3	...	...	...	2	...	...	...	...	...	...	...	11	...	11
...	4	2	5	1	14	...	5	...	5	...	5	...	1	...	1	...	...	...	50	6	56
...	...	...	...	1	3	2	3	2	...	...	...	...	1	...	...	1	...	...	10	8	18
...	...	...	...	1	12	3	12	4	8	1	5	...	1	...	...	...	...	1	40	10	50
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	1	1	...	...	...	...	1	...	...	...	...	...	...	...	2	1	3
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1
...	...	1	...	1	5	4	4	1	5	7	5	5	9	8	13	14	2	5	59	66	125
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	172	103	275
55	41	48	59	52	282	151	357	154	405	106	340	125	223	102	220	86	98	54	2809	1472	4281

TABLE NO. IX.

SHOWING THE POPULATION OF THE VARIOUS COUNTIES, CITIES IN THE STATE, AS GIVEN BY THE U. S. CENSUS BUREAU IN 1900 AND 1910.—THE INCREASE (OR DECREASE) DURING THE TEN YEARS; THE ESTIMATED POPULATION FOR 1911; THE DEATH RATE PER 1,000 POPULATION IN 1910 AND IN 1911.

NOTE—In this table, the population of certain counties not being known for 1900, we have no basis for estimating their population for 1911. We have therefore, combined Custer and Rosebud; Deer Lodge and Powell; Fergus and Musselshell; Flathead and Lincoln; Missoula and Sanders counties, in order that we may have a basis for estimating their population for 1911.

	Population—1900.	Population—1910.	Increase in 10 years.	Annual Increase.	Estimated Population, 1911.	Death Rate per 1,000 Pop. in 1910.	Death Rate per 1,000 Pop. in 1911.
Beaverhead	5,615	6.446	831	83	6.529	10.4	9.0
Broadwater	2,641	3,191	850	85	3.576	11.4	9.8
Carbon	7,533	13,962	6,429	642	14,604	9.6	9.0
Cascade (Excl. of)	10,847	11,885	4.038	403	15,288	6.6	6.0
Great Falls	14,930	13,948	—982	—98	13,850	18.2	15.2
Chouteau	10,966	17.191	6.225	622	17.813	7.3	6.8
Custer and Rosebud	7,891	* 22,108	* 14,217	1,221	23.329	(4) 5.4	9.4
Dawson	2,443	12,725	10,282	1,028	13.753	8.5	7.2
Deer Lodge and Powell (Excl. of)	7.940	8,758	818	81	8,839	(5)17.1	(5)16.2
Anaconda	9,153	10.134	681	68	10,202	13.7	12.1
Fergus and Musselshell	6,937	17,385	10,448	1.044	18,429	6.5	8.4
Flathead and Lincoln (Excl. of)	6,849	16.874	10,025	1.002	17,876	9.1	7.4
Kalispell	2,526	5.549	3.023	302	5.851	18.9	7.3
Gallatin (Excl. of)	6.134	8,972	2,838	283	9,255	7.7	9.2
Bozeman	3,419	5.107	1,688	168	5.275	11.3	8.7
Granite	1,328	2.942	—1,386	—138	2.804	9.1	7.9
Jefferson	5.330	5,601	271	27	5,628	11.0	7.1
Lewis and Clark (Excl. of)	8.401	9.338	937	93	9.431	8.1	6.1
Helena	10,770	12,515	1.745	174	12,689	14.6	14.4
Madison	7,695	7,229	—466	—46	7,183	9.5	11.8
Meagher	2,526	4.190	1,664	166	4,356	5.9	7.1
Missoula and Sanders (Excl. of)	9,998	14,440	4,842	484	14,924	6.5	9.1
Missoula City	4,366	12,869	8.503	850	13,719	16.6	12.1
Park (Excl. of)	4.563	5.372	809	80	5.452	12.2	7.3
Livingston	2,778	5.359	2,581	258	5,617	12.4	9.4
Ravalli	7,822	11.666	3.844	384	12,050	8.2	8.1
Silver Bow (Excl. of)	17,165	17,683	518	51	17,734	15.8	13.4
Butte	30,470	39.165	8,695	869	40,034	15.3	15.8
Sweet Grass	3,086	4,029	943	94	4,123	6.4	6.5
Teton	5,080	9,446	4.466	446	9,892	5.6	11.7
Valley	4,355	13.630	9,275	927	14,557	5.0	10.3
Yellowstone (Excl. of)	2,991	(2) 12,913	(2) 9,922	926	13,839	7.8	4.7
Billings	3,221	10.031	6,810	681	10,712	14.0	13.9
Totals	243,329	(3)378,713	(3)135,384	13,272	391,985	10.5	10.2

* This includes about 2,000 Crow Indians not enumerated in 1900 and hence not used in estimating annual increase.

(2) This includes about 660 Crow Indians not enumerated in 1900 and hence not used in estimating annual increase.

(3) This includes about 2,660 Crow Indians not enumerated in 1900 and hence not used in estimating annual increase.

(4) No death records received from Indian Reservations for 1910.

(5) Death rate materially increased by deaths at the State Insane Asylum.

TABLE NO. X.

DEATHS PER 1,000 POPULATION IN REGISTRATION STATES FOR 1909, AS SHOWN BY THE LAST VITAL STATISTICS REPORT OF THE UNITED STATES CENSUS BUREAU.

California	13.4
Colorado	14.2
Connecticut	15.0
Indiana	12.9
Maine	15.6
Maryland	15.5
Massachusetts	15.4
Michigan	13.1
New Hampshire	16.9
New Jersey	14.7
New York	15.7
Ohio	12.9
Pennsylvania	14.7
Rhode Island	15.6
South Dakota	8.5
Vermont	15.7
Washington	9.8
Wisconsin	11.8
In 1910 Montana shows	10.5
and in 1911	10.2

TABLE XI.—BIRTHS REPORTED TO THE STATE BOARD OF HEALTH DURING THE TWO YEARS ENDING DECEMBER 31, 1911.

COUNTY.	Males—1910.	Males—1911.	Females—1910.	Females—1911.	Totals—1910.	Totals—1911.
Beaverhead	52	63	55	59	107	122
Broadwater	32	34	27	38	59	72
Carbon	183	198	146	197	329	395
Cascade (Excl. of)	79	152	43	116	122	268
Great Falls	252	222	241	220	493	442
Chouteau	99	127	97	113	196	240
Custer	91	143	91	119	182	262
Dawson	128	174	116	164	244	338
Deer Lodge (Excl. of)	.....	6	.....	3	.....	9
Anaconda	98	107	113	95	211	202
Fergus	129	159	159	147	288	306
Flathead (Excl. of)	25	133	60	101	85	234
Kalispell	104	85	99	78	203	163
Gallatin (Excl. of)	83	93	50	83	133	176
Bozeman	82	75	75	72	157	147
Granite	20	28	22	25	42	53
Jefferson	44	45	33	56	77	101
Lewis and Clark (Excl. of)	10	47	13	35	23	82
Helena	146	146	122	144	268	290
Lincoln	33	33	19	25	52	58
Madison	73	55	52	56	125	111
Meagher	26	56	30	44	56	100
Missoula (Excl. of)	42	66	57	74	99	140
Missoula City	158	167	136	128	294	295
Musselshell	.....	65	.....	50	.....	115
Park (Excl. of)	30	38	29	44	59	82
Livingston	109	74	72	80	181	154
Powell	44	47	53	45	97	92
Ravalli	116	126	112	118	228	244
Rosebud	31	30	34	30	65	60
Sanders	22	33	23	22	45	55
Silver Bow (Excl. of)	71	154	52	163	123	317
Butte	343	395	357	386	700	781
Sweet Grass	53	35	38	41	91	76
Teton	48	98	29	79	77	177
Valley	95	150	79	140	174	290
Yellowstone (Excl. of)	82	104	57	105	139	209
Billings	148	149	152	135	300	284
Total Births	3,181	3,912	2,943	3,630	6,124	7,542
Total Dearhs					3,996	4,006
Excess of Births over Deaths					2,128	3,536

NOTE—Musselshell County was included in Fergus until March, 1911.

TABLE NO. XII.—SHOWING DEATHS FROM ENTERIC DISEASES FOR FIRST NINE MONTHS OF EACH YEAR, 1910-1911-1912.

COUNTY.	1910	1911	1912
Beaverhead	....	....	....
Broadwater	2	1	3
Carbon	9	6	1
Cascade Exc(l. of)	5	10	3
Great Falls	22	7	6
Chouteau	16	3	....
Custer	4	8	2
Dawson	10	7	....
Deer Lodge (Excl. of)	2	1	....
Anaconda	11	3	1
Fergus	15	2	....
Flathead (Excl. of)	11	3	....
Kalispell	11	1	2
Gallatin (Excl. of)	1	1	2
Bozeman	1	4	....
Granite	3	1	....
Jefferson	4	....	....
Lewis and Clark (Excl. of)	2	3	....
Helena	4	12	2
Lincoln	....	....	2
Madison	1	1	2
Meagher	2	....	....
Missoula (Excl. of)	1	2	....
Missoula City	8	4	3
Musselshell	....	2	....
Park (Excl. of)	2	1	....
Livingston	7	4	2
Powell	2	....	1
Ravalli	4	1	1
Rosebud	....	1	....
Sanders	3	2	....
Silver Bow (Excl. of)	24	13	6
Butte	27	21	14
Sweet Grass	3	1	....
Teton	....	2	2
Valley	4	16	1
Yellowstone (Excl. of)	11	4	....
Billings	14	12	3
Totals	246	160	59

Department of Food and Drugs.

The Legislature of 1911 enacted a law commonly known as the Pure Food Law. This law went into effect the first of January, 1912.

During 1911 the Board of Health did a large amount of work compiling the standards for foods and food products and sanitary regulations for places where all food products are handled, sold or offered for sale.

This is a new field of work in Montana, though it is old in many other States, in fact most of them, and I, as Secretary and Executive Officer of the State Board of Health, am free to admit that I was somewhat surprised at the uniformly agreeable manner in which the people of this State handling food products, with the single exception of the dairymen, accepted the requirements placed upon them relative to how their food products and places where such food products are handled should be conducted.

The dairymen have, in a number of instances, advanced strenuous objections to the regulations placed upon them, and it is our understanding that they are to have a strong lobby before the Legislature this winter with the object in view of inducing that body to repeal the regulations that require them to conduct their places in a clean and sanitary manner and to furnish to the people of this State milk and milk products that are up to a high standard in quality, both as regards cleanliness and food values contained in the product.

We present below the regulations adopted by the State Board of Health for the various places where food products are handled and we wish to especially call your attention to the regulations relative to dairies, for it is with regard to these regulations and these only that objections have been advanced.

That the State Board of Health has not been arbitrary in this matter is evidenced by the fact that a meeting of dairymen and creamerymen was held in Helena in November, 1911, at which time the Secretary of this Board and the Governor of the State appeared before these gentlemen and went over these regulations with them. Only about two present evidently objected to the regulations, but with these exceptions we found the gentlemen to be reasonable. We discussed the regulations and they asked for certain changes. Every change that these gentlemen asked for with one exception was granted. This single exception was the amount of air space required in the dairy barn and this change was not granted because the regulation is a regulation for the protection of the dairymen himself. It is not reasonable to suppose that cows can be housed in a barn without proper ventilation and remain healthy any more than can human beings live in houses without proper ventilation and remain healthy. Therefore if the dairymen were granted the request they made, namely, that there be no regulation on the amount of air space required, we would find that tuberculosis would spread among the cattle of this State to such an alarming extent that it would not be long before milk and milk products from this State would be prohibited from sale in other States, whereas this State should be furnishing milk and milk products to many of our older States, and it can readily do this and can produce a quality of cream and milk products that will sell at the highest market price, provided those handling these products will conduct their places under clean and sanitary conditions, but the day has passed when a cow can put her foot in the milk bucket and the milk in which she put this foot be sold as a food product. A few people will accept this mixture of milk and manure for food, but only a few. The people know that milk can be produced clean and they will demand it.

However, before too much attention is given to the complaint of the dairymen relative to these regulations, we respectfully request that you examine Table XII of this report. This table sets forth the deaths from enteric diseases for the first nine months of the years 1910-1911 and 1912. We have used nine months of each year in order that we might be able to compare the records of 1912 with those of 1910 and 1911. In other words the conditions that resulted before the dairymen began to clean up, the conditions while they were cleaning up and the conditions resulting during 1912 after they had cleaned up to some extent. I use the expression "to some extent" advisedly, for all of the dairymen have by no means come up to the standard required, and yet note the results.

Enteric diseases are due largely to the use of impure foods and as this disease occurs most extensively in young children whose sole food product is milk, the result of requiring that milk be produced under clean conditions is astounding.

You will note that in nine months of 1910 there were 246 deaths from this disease, in 1911 there were only 160 deaths from the same disease, while in 1912 we find only 59 deaths from these diseases. In other words we note a reduction of 187 deaths between 1910 and 1912 from diseases that result from feeding children impure and dirty milk, and please note that no attention is given to our increased population between 1910 and 1912, which would entitle us to consider even a greater reduction in these deaths than is apparent on the face of these figures.

We feel that we are entitled to feel some pride in that we are able to show this reduction in deaths among our people and if the Honorable Legislators of this State believe that it is more important that the dairy industry be fostered at the expense of these lives, than it is that these lives be saved, then the State Board of Health is a useless adjunct to the machinery of this State. But on the other hand, if the Legislators believe that these lives are worth more than the slight increase of cost in the production of milk that will result from requiring the dairymen to conduct their places in a clean and sanitary manner, then we appeal to you for support in this work and that you enable us to go on and save lives, the result of which has been shown with only one year's even moderate enforcement of our pure food regulations.

Another subject that the dairymen will present to you very forcibly, and one in which we are free to confess we believe there is some merit, is the destruction of tubercular cattle without some compensation therefor. It seems hardly right that the dairyman should be called upon to stand the entire loss of cattle found to be tubercular, when these cattle are killed for the protection of the general public. But we do not feel that the dairyman should be placed in a position where he can possibly buy tubercular cattle and when they are found by the inspector to be tubercular to have the State pay him for cattle that he has probably purchased at a nominal price. Therefore some arrangement would have to be made in order to overcome this and it appears to us that this might be done by granting a sliding scale compensation for cattle killed on account of their being found tubercular.

Without wishing to be considered as in any way dictating a proper compensation, we would respectfully suggest that for the first year a compensation of two-thirds the actual value of the animal killed might be allowed, for the second year one-half its actual value and the third year one-third its actual value. After the third year that no compensation be allowed, because if the dairyman gets tubercular cattle into his herd after the third year, it is his own fault and the result of lack of care on his own part and he should stand the loss that is the result of his own negligence.

Another feature that has been suggested that would help materially in the work is that when a man has his own cows tested and declares certain cows tubercular that he be allowed an additional five dollars for each animal so declared. This would encourage the dairymen to clean up their own herds, instead of waiting for the State to come and do it for them.

We respectfully request that you read carefully and thoughtfully the following regulations adopted by the State Board of Health for the dairies of this State and that, if you believe that these regulations place a greater hardship upon the dairyman than the death of a child places upon the father and mother of that child, you call upon the State Board of Health to abolish its regulations. On the other hand, if you believe that the saving of these lives is worth the effort made and the money expended, that you do not place the sanitary regulations for dairies in the hands of a dairy commissioner whose object will be to increase the dairy products of the State without regard to the protection of human life.

I do not mean to be considered as decrying the importance of a Dairy Commissioner. This official is needed in our State. His duty should be to teach the dairymen how to keep clean and how to produce the greatest returns from his dairy cattle. But it does appeal to me that the protection of human life and the sanitary direction of dairies as well as other places of business where food products are handled, should come under the direct supervision of the State Board of Health, whose function it is to endeavor to protect the health and lives of our people.

I have stated that all dairies do not come up to the standard. A large number of them we have warned that they must come up to standard in regard to the sanitary conditions of their dairies, and in a few instances we have revoked licenses of those who have neglected to make improvements. But a fair per cent of the dairies of the State have not been inspected at all. This is due to the lack of control of the State Board of Health over local and County Health Officers and in at least one instance to the disposition of the Board of County Commissioners to interfere with these instructions.

We find in one County there are 126 people who have taken out licenses to conduct dairies, that there are four other places in this County from which butter is sold, making a total of 130 places requiring inspection and yet 59 of these places have not been inspected during the year.

In another County we find that 273 places have not been inspected, in another 149; in another, 95; another, 200; etc., as set forth in Table XVI of this report.

The State Board of Health has repeatedly called the attention of the county Health Officers to their failure to inspect all places requiring inspection. From some we have gotten reply that the County Commissioners have instructed not to create any expense in making these inspections, in others that the County Health Officer has not been allowed one cent increase in salary since the adoption of the Pure Food law (neither has the State Health Officer for that matter), and that their salary will not justify them in spending time in making these inspections. In one County the Health Officer reported that the County Commissioners had absolutely refused to allow his traveling expenses while making these inspections and therefore he refused to make further inspections. In the large majority of instances letters bringing these matters to the attention of the County Commissioners have apparently been treated with utter indifference, at least no improvement has resulted therefrom, except in one instance in which the County Commissioners removed the Health Officer from office and appointed another in his place.

But it is not always the underpaid Health Officer who does the poorest work, or conversely, it is not always the Health Officer who receives the highest salary that does the best work. In one city that I have in mind the local Health Officer's salary was increased $75.00 a month on account of the duties imposed on him under the Pure Food law. The Secretary of the State Board of Health visited this city and inspected every place there where food products are handled in a single day and yet the local health officer, being allowed $75.00 a month for work that the State Health Officer did in one day does not make any more thorough inspections than does the Health Officer in another city of similar size who receives only $50.00 per month as his entire compensation as Food Inspector and Health Officer.

Another element that has given us great trouble is the inclination of the small incorporated towns to appoint some doctor in the town as local Health Officer and then refuse to give him any compensation whatever. When the Mayors in these towns are written to we receive discouraging, not to say insulting replies, when we receive any reply whatever.

Therefore if a thorough inspection is to be secured, the State Board of Health must be given absolute control over local inspectors, and no local man is going to do thorough work until he is given a salary that will justify his doing proper work and this salary be made sufficient to justify his devoting his time to the work, and when such salary is allowed the Health Officer should be required to devote his time to sanitary work and should be prohibited from engaging in the practice of medicine in either public or private capacity.

This can be easily accomplished by the smaller counties combining and two appointing a single Health Officer, the small towns placing themselves under the care of the County Health Officers and paying a small proportion of the salary allowed. In this way the total expenditure of two small counties and the small towns therein would be no more, if as much, as is being paid now for inefficient services. It is difficult to use an illustration without being taken as wishing to discredit the work of the local man, but I believe the Health Officer in the County I am about to use as an illustration realizes my position and will not feel that the following remarks are intended as in any way to discredit his work.

One man devoting his entire time to sanitary work could very well cover all the territory and make all the inspections required in Sweet Grass and Park Counties. Park County is now paying $1,200.00 a year to her County Health Officer, Sweet Grass is paying $800.00 a year and the City of Livingston is paying $600.00 a year, making a total of $2,600.00 paid by the two Counties and the City of Livingston. Now if these two counties would combine they could employ the entire time of a Health Officer and his traveling expenses would be no greater in proportion than are the traveling expenses now paid to two County Health Officers. In this way the man employed could afford to devote his time to the study of sanitary problems and would not be in any way influenced in giving a decision on insanitary conditions because of the fact that the insanitary condition might exist on the property of a good patient or a prospective patient of his. Until this is done we cannot hope to be rid of the numerous complaints that come to us to the effect that Jones' place is inspected and condemned, while Brown's place has never been inspected.

Another feature that is frequently brought to our attention or that is frequently complained of is that there are some dairymen conducting dairies without the State license, as required by law. We desire to present to you the efforts we have made to secure the names of all persons selling milk or milk products in this State.

We first wrote to the Health Officers in the various localities asking them to give us the names of all persons in their localities selling milk there direct for human consumption or to creameries. The replies to these letters indicated that there were very few people handling or selling milk in this State. We next wrote to all the creameries of the State and asked them for a list of all persons who were selling milk or cream to them. These lists very materially increased the names of those selling milk or milk products in the State. These lists were then divided into Counties and sent to the County Health Officer and he was called upon to find out whether all these people were selling milk. In addition a copy of the dairy regulations, a license application blank and a letter calling attention to the law were sent to each name that we had been able to secure of people who were said to be selling milk in the State.

The Health Officers are supposed to have checked these lists and returned them to us, but we have reason to believe, in fact we have very strong evidence that in some instances, at least, these lists were not very carefully checked.

In addition to this we have watched in our travels over the State the depots and taken names of the shippers from cans being forwarded to creameries, and in this way we have secured the names of dairymen we had not gotten from the creameries or other sources.

If there are dairymen in the State selling milk without a license, and we believe there are, we have been unable to secure their names or evidence against them. Frequently complaints have been made without foundation, as is instanced by one case in Helena, where one dairyman complained very strenuously of this man selling milk. We went to this man and asked him about it. He denied selling milk to anybody. We had him watched for a week and we saw no evidence during this week that he sold milk or milk products and we have in our office today a sworn statement from this man that he has not sold a drop of milk or butter since the first of January, 1911.

That it is entirely possible to inspect all of the dairies and other places where food products are handled in this State by employing the whole time of comparatively few men, is indicated by the fact that the one special inspector employed by the State Board of Health has in six months inspected 1,286 places where food products are handled, divided as follows:

Dairies	354
Hotels and Restaurants	482
Meat Markets and Slaughter Houses ..	245
Confectioneries and Bakeshops	97
Other Places of Business	108

It is to be noted that these places of business were scattered over the entire State, during these three months every County having been visited with the exceptions of Beaverhead, Granite, Lincoln and Madison Counties. In fact it is our belief that six men devoting their entire time to this work can make regular monthly inspection of every place in the State where food products are handled.

In Table XIII we have set forth the number of inspections made in each County and the principal cities of the State and the character of the place inspected. This shows a total of 13,131 inspections made in the State during nine months. This does not include the 1,286 inspections made by our special inspector.

Table XIV shows the number of meat markets and slaughter houses inspected, the average number of inspections of each place and the highest and lowest grade found on these various places

Table XV shows the same with regard to confectioneries and bakeshops.

Table XVI sets forth in tabulated form the same information with regard to the number of dairies, number of cows in the dairies, number of cows tuberculin tested and the number of reactors found.

Table XVII sets forth the same information relative to hotels and restaurants.

Table XVIII shows the work done by one general inspector in six months.

REGULATIONS ADOPTED BY THE STATE BOARD OF HEALTH NOVEMBER 18, 1911.

Dairies.

Regulation 1. No building shall be used for stabling cows for dairy purposes which is not properly constructed, well lighted two (2) square feet of light for each cow, ventilated, and provided with properly constructed gutters or dropping troughs and a floor that can be readily kept clean and properly drained.

Provided, that in existing dairy barns having not less than one (1) square foot of light per cow, the owner of such barn will be given until June 1, 1912, to make the necessary changes to provide two (2) square feet of light for each cow.

This does not prohibit a person milking cows for creamery purposes only in the corral or barn yard, provided such corral or yard is at all times kept clean and in a sanitary condition.

Regulation 2. No water closet, privy, cesspool, urinal, inhabited room or workshop shall be located within any building, shed or room which is used for stabling cows for dairy purposes, nor shall any privy, urinal or cesspool be permitted within one hundred (100) feet of such building; nor shall any hog, horse, sheep, goat or other animal be kept in any room which is used for stabling cows for dairy purposes.

Regulation 3. All persons milking any cows must thoroughly wash their hands with soap and water immediately before beginning to milk, and in dairies where the milk is sold direct for human consumption, there must be provided in the dairy barn sufficient wash basins, soap, and clean water, where employes may wash their hands.

Regulation 4. No cow that is sick shall be kept in the barn with cows used for dairy purposes (this does not apply to cows that have been physically injured) nor shall any cow be permitted to calve in such building, unless such calving cow be confined in a box stall, or separate room.

Regulation 5. No space in buildings or sheds used for stabling cows for dairy purposes shall be less than 400 cubic feet for each cow, and the stalls thereof shall not be less than three feet in width.

Regulation 6. All rooms or stables in which cows are kept for dairy purposes, must be thoroughly clean at all times, and must be painted once every two (2) years, or lime washed once each year.

Regulation 7. All manure shall be removed from the room or stable in which cows are kept for dairy purposes at least once each day, and shall not be stored within less than one hundred (100) feet of the stable at any time after the first day of May and before the first day of November of each year. Between the first day of November and the thirtieth day of April, manure may be stored at a point not less than twenty (20) feet from the barn and all manure thus stored must be removed to a point not less than one hundred (100) feet from the barn, on or before the thirtieth day of April of each year.

Provided, that when manure is placed in an inclosure surrounded by a tight board fence, the drainage of such inclosure being away from the barn and dairy buildings, the removal of manure to a distance of fifty (50) feet from the barn will be permitted.

Regulation 8. Every person keeping cows for the production of milk for sale shall cause the long hairs to be clipped from the udder of each cow monthly and cause the udder of each cow to be thoroughly cleaned before each milking.

Regulation 9. Every person keeping cows shall provide an abundant supply of pure, fresh water for them.

Regulation 10. Any enclosure in which cows are kept for dairy purposes shall be graded and drained so as to keep the surface reasonably dry and prevent the accumulation of water therein, and no garbage, fecal matter or similar substance shall be placed or allowed to remain in such enclosure.

Regulation 11. No cows used for dairy purposes shall be fed on nor permitted to eat any stable bedding or other refuse from any barn, nor any fermenting distillery, brewery or beet sugar factory refuse.

Regulation 12. Every person keeping cows for dairy purposes, shall provide and use, a sufficient number of pails, cans or other receptacles, made of glass, stoneware, glazed material, or number one tin, for the reception of, storage and delivery of milk, and shall cause all milk, as soon as drawn from each individual cow, to be strained into a milk can (not to exceed ten (10) gallons) provided with an air-tight cover, which cover shall at all times be kept on the can while in the barn, except when the milk is being strained into such can, and the can shall be removed from the barn as soon as filled.

Regulation 13. The milk room shall be thoroughly screened with not coarser than 14 mesh wire gauze and thoroughly protected against flies, properly lighted and ventilated, kept scrupulously clean and free from dust, shall not be used as a living or sleeping room, nor in any way connected with any room used for domestic or other purposes, and shall be separate from the barn or stable in which the cows are kept. It shall be provided with a floor made of cement, tile laid in cement, oiled wood or other impervious material, and shall be provided with pure water and suitable facilities for straining, cooling and storing milk, and washing and sterilizing all utensils and apparatus in which milk is received, stored and delivered. No milk room shall be used for any other purpose than that of handling and storing milk and cream.

Provided, that in dairies where cream is produced only for creamery purposes, and in other dairies where not to exceed four (4) cows are milked, one room of the residence used for other purposes may be used instead of a milk house; provided, that such room is at all times kept in a clean and sanitary condition.

Regulation 14. All cans, measures, bottles and other receptacles of any sort used in the sale or handling of milk shall be sterilized (scalded with boiling water or live steam) daily.

All separators must be thoroughly cleaned and scalded immediately after each using.

Regulation 15. Immediately upon straining, all milk must be cooled as quickly as possible, to a temperature not exceeding 50 degrees F. and shall be maintained, at a temperature of not exceeding 50 degrees F. until delivered to consumer.

Provided, that where milk or cream is produced for creamery purposes only, the cream shall be cooled to as low a temperature as possible, with ice or water available, as soon as separated.

Regulation 16. All milk cans delivered to creameries or dairies, shall be covered with air-tight lids, and when conveyed in open wagons, shall be covered with a white canvas or clean cloth while being conveyed, and such canvas or cloth shall be clean and free from dirt of any kind.

Regulation 17. All milk delivered to any residents, hotel, restaurant or other place, where such milk is intended for human consumption, shall be conveyed in receptacles provided with air-tight covers and transported in a covered vehicle.

Provided, that milk may be transported in open vehicles when the container of such milk is covered with white canvas while being transported. Such canvas being at all times clean and free from dirt and that none of the contents of such container be transferred from one can or container to another in the open, but all transferring be done entirely in rooms or buildings suitable therefor.

Regulation 18. Every person engaged in the production, storage, transportation, sale, delivery or distribution of milk, immediately on the occurrence of any case or cases of infectious disease either in himself or in his family or among his employes or their immediate associates, or within the building or premises where milk is stored, sold or distributed, shall immediately notify the local or County Health Officer of the existence of such disease.

Regulation 19. No milk, cream, or other dairy product shall be sold or delivered from any dairy where there is a contagious or infectious disease on the premises, nor shall any person exposed to any contagious or infectious disease be permitted to milk any cows or handle any vessels used for milk until all danger of communicating such disease to other persons shall have passed, and no milk shall be sold from any dairy where there has been a contagious or infectious disease on the premises until the premises have been thoroughly disinfected under the supervision of the health officer and all utensils used in any connection with the handling of milk have been thoroughly sterilized with boiling water or live steam, and the written approval of the health officer secured.

Regulation 20. No bottle, can, or other receptacle, used for the reception or storage of milk shall be removed from a private house, hotel, apartment, or tenament wherein a person has any contagious or infectious disease without the written approval of the health officer.

Regulation 21. Vessels used for storing or transporting milk shall not be used for any other purposes and the placing of any material other than milk in any such vessel shall be deemed sufficient cause for revoking the license of the dairyman permitting such use. This does not prohibit the use of water in vessels for cleaning purposes.

Regulation 22. The clothing worn by those milking cows or engaged in any way in connection with the handling or delivering of milk at or from any dairy must at all times be thoroughly clean.

Regulation 23. All ice used in and about any dairy must be pure and come from an uncontaminated and unpolluted source.

Regulation 24. All dairies must be inspected at regular intervals by local and county health officers and special inspectors and when inspected will be scored according to the score card which is a part of these regulations. When the score of any dairy shall fall below 70 but shall reach 60 or more the owner or proprietor of such dairy will receive a warning note, and if on subsequent inspection, the score shall again fall below 70, or when the score of any dairy shall fall below 60, the license of such dairy will be revoked and milk from such dairy will be deemed as having been produced under unsanitary conditions, the sale of which is contrary to law.

When a dairy license is revoked for any cause the Secretary of the State Board of Health shall notify such dairyman of the time and place of the next meeting of the State Board of Health and such dairyman shall have the privilege of appearing before said Board of Health to show cause why his license should not be permanently revoked.

Regulation 25. These regulations must be posted in a conspicuous place in every dairy.

Regulations for Slaughter Houses and Meat Markets.

Regulation 44. All slaughter houses in which animals of any kind are slaughtered, the meat of which is intended for human consumption in this State, must have an abundant supply of water from a well or other source which is not contaminated.

Regulation 45. All slaughter houses must have water tight floors made of non-absorbent material. In slaughter houses where slaughtering is done each day, the floors must be thoroughly washed daily, where slaughtering is done at irregular intervals, the floors must be thoroughly washed immediately after slaughtering is completed; and all effluvia and wash water shall be conducted to a point not less than one hundred (100) feet away from the slaughter house and so disposed of as to prevent it entering any stream or pond or to contaminate any well whose waters are used in connection with the slaughter house, or that may be used for domestic or manufacturing purposes.

Regulation 46. All slaughter houses hereafter constructed in the State of Montana must be provided with cement, or tile floors and when it shall be found on inspection by any health officer that the floor in use in any slaughter house is composed of material of an absorbent character in which the effluvia collects and forms an insanitary condition such floors must be removed and replaced by a floor made of non-absorbent material.

Regulation 47. The walls and all exposed surfaces on the inside of a slaughter house must be cleaned by washing or scraping as often as may be necessary in order to keep the premises in proper sanitary condition. If the walls are not painted they must be limewashed at least every three months. Painted walls must be repainted at least once every year.

Regulation 48. All rooms where animals are killed or where meat is handled or displayed must be completely screened with not coarser than 14 mesh wire screen, at all doors, windows and other openings and properly protected from flies.

Regulation 49. When the walls, tables or any equipment used about a slaughter house are found to be in such condition that they cannot be readily made sanitary, they shall be removed and replaced by proper materials of a sanitary character.

Regulation 50. All trucks, trays and other receptacles, all chutes, platforms, racks, tables, et cetra, and all knives, saws, cleavers and other tools and all utensils and machinery used in moving, handling, cutting, chopping, mixing, canning, or other process shall be thoroughly cleaned daily if used.

Regulation 51. The aprons, overalls or other outer clothing of employes who handle meat shall be of a material that is readily cleaned and made sanitary and shall be cleaned daily if used. All persons who handle meats or meat food products shall be required to keep their hands clean at all times, and for this purpose wash basins with an abundant supply of soap and pure clean water must be provided at the slaughter house and meat market.

Regulation 52. No person suffering from or who has been exposed to any contagious or infectious disease shall be permitted to work in or about any slaughter house or meat market or to handle any meat intended for human consumption until such person has been thoroughly disinfected under the supervision of the health officer and authorized by him to perform such duties.

Regulation 53. All offal and refuse must be removed from the slaughter house on the day of the slaughter and disposed of in a sanitary manner.

Regulation 54. When the carcasses are to remain in the slaughter house for a greater length of time than twelve (12) hours, the slaughter house must be provided with a cooler or ice box for the proper cooling and curing of meat and the carcasses must be placed in such cooler or ice box directly after being slaughtered and kept there until removed from the premises. Cooling and storage rooms must be properly ventilated and at all times kept in a clean and sanitary condition.

Regulation 55. All pens and enclosures connected with any slaughter house must be kept in a clean and sanitary condition, and no hogs or other animals shall be kept within one hundred (100) feet of any slaughter house.

Regulation 56. No slaughtering shall be done in barns, sheds, shipping pens or other buildings not designed or suitable for the slaughtering of animals and the handling, dressing and cooling of meats; nor shall any slaughtering be done outside of any building except in rural districts and then only when the meat is intended for private consumption.

Provided that this regulation shall not be construed as prohibiting a rancher from slaughtering his own cattle on his own premises and delivering portions of the carcasses thereof to customers in quantities of not less than fifteen (15) pounds to each customer.

Regulation 57. Carts or vehicles in which meats or meat food products are transported, peddled or delivered shall be so constructed as to protect the meat from contamination by flies, dust or other extraneous matter; and the boxes or bodies of such carts or vehicles must be washed daily, if used, and maintained in a sanitary and cleanly condition.

Regulation 58. Meat, whether entire carcasses, quarters or cuts thereof, shall not be transported by teams, wagon or otherwise, unless covered by clean white cloths, or other material equally impervious to dust or other extraneous matter, and in such manner as to protect it from contamination by flies, dust or other extraneous matter.

Markets.

Regulation 59. Meat markets, fish markets, or butcher shops or stalls shall be completely screened as a protection against flies, the floors shall be thoroughly scrubbed once each day and scraps of meat, offal, bones, and other refuse organic matter shall not be left exposed to the atmosphere of the room, but must be kept in a closed receptacle, which must be emptied once daily; the meat for sale shall not be kept exposed to the air except in such quantities as are wanted for immediate use but shall be kept in an adequate refrigerator or ice chest; under no circumstances shall meat or meat food products be exposed outside of the screened room; all tainted meat shall be removed from the premises at once.

Regulation 60. All trays, counters, racks, tables, blocks, etc., shall be thoroughly scraped and cleaned at least once each day and as much oftener as may be necessary to keep them in a clean and sanitary condition; and all knives, saws, cleavers, and other tools and all utensils and machinery used in moving, handling, cutting, chopping, mixing, canning, or other process shall be thoroughly cleaned and washed in boiling water.

Regulation 61. The room or compartment in which meat or meat food products are prepared, cured, stored, packed or otherwise handled shall be properly lighted and ventilated, and shall be so located that odors from toilet rooms or catch basins, tank rooms, hide cellars, etc., do not permeate them. All rooms or compartments shall be provided with cuspidors, which employes who expectorate shall be expected to use. Where meat food products are prepared in market, i. e., sausage, lard, pickled pork, etc., a separate room properly ventilated, lighted and supplied with pure water shall be provided for this purpose exclusively with the exception that sausage may be ground in the market proper, when such grinding is done under thoroughly sanitary surroundings.

Regulation 62. All ice used in contact with any meat or meat food products must be pure and free from pollution and must have been made from unpolluted water.

Regulation 63. All slaughter houses and meat shops shall be inspected at regular intervals by local and county health officers and special inspectors, and when inspected shall be scored according to the score card which is part of these regulations. When the score of any slaughter house or meat shop shall fall below 70, but shall reach 60 or more, the owner or proprietor of such slaughter house or meat shop shall receive a warning note, and if on subsequent inspection, the score shall again fall below 70, or when the score of any slaughter house or meat shop shall fall below 60, the license of such slaughter house or meat shop will be suspended and meat or meat food products from such slaughter house or meat shop will be deemed as having been produced under unsanitary conditions, the sale of which is contrary to law.

When a slaughter house or meat shop license is suspended for any cause, the Secretary of the State Board of Health shall notify the owner or proprietor of such slaughter house or meat shop of the time and place of the next meeting of the State Board of Health, and the owner or proprietor of such slaughter house or meat shop shall have the privilege of appearing before said Board of Health to show cause why the license of such slaughter house or meat shop should not be revoked.

Regulation 64. These regulations must be posted in a conspicuous place in every slaughter house and meat shop.

REGULATIONS FOR CONFECTIONERY SHOPS.

Regulation 65. Any room in which any confectionery product is prepared must be well lighted and ventilated. The floors must be of cement, tile, oiled wood or other impervious material. The walls and ceiling must be painted or lime washed. Walls, ceilings, floors, boxes, pans, machines, and all other utensils used in mixing, or in handling in any way any confectionery product must be kept in a clean and wholesome condition at all times. No water closet shall be directly connected with the working room of any confectionery shop or factory.

Regulation 66. Before beginning work and before preparing and mixing the ingredients, the persons engaged in the work must wash their hands and arms thoroughly in clean water. For this purpose sufficient wash basins, together with soap, pure water and clean towels must be provided.

Regulation 67. Persons employed in the establishment must while working, wear clean clothing, preferably white suits.

Regulation 68. No person having any communicable disease and no person who has been exposed to any contagious or infectious disease shall be employed in or permitted to work in any confectionery shop or factory until such person presents a written statement from a health officer showing that he has been properly disinfected and that there is no longer any danger of his transmitting a communicable disease.

Regulation 69. All windows and doors must be protected from flies by the use of screens made from not coarser than 14 mesh wire gauze.

Regulation 70. The supplies must be stored in dry places, where they are protected from all contamination.

Regulation 71. The confectionery products must at all times be handled in a clean and sanitary manner and must be protected from flies and other sources of contamination.

Regulation 72. It is strictly forbidden for any person to sit or lie on any of the tables, shelves, etc., which are intended for confectionery. Chairs and benches in sufficient number must be provided to sit on.

Regulation 73. The working rooms must be furnished with cuspidors, at least one in each room, which must be cleaned daily Spitting on the floor is forbidden. Smoking in the working rooms is prohibited.

Regulation 74. Working rooms must not be used for any purposes other than those strictly connected with the preparing of confectionery.

Regulation 75. Domestic animals must not be kept in the confectionery shop or factory.

Regulation 76. Any confectionery showing dirt or filth shall be deemed as an inpure food product, the sale of which is prohibited by law.

Regulation 77. All confectionery shops and factories shall be inspected at regular intervals by local and county health officers and special inspectors, and when inspected will be scored according to the score card which is part of these regulations. When the score of any confectionery shop or factory shall fall below 70, but shall reach 60 or more, the owner or proprietor of such confectionery shop or factory shall receive a warning note, and if on subsequent inspection, the score shall again fall below 70, or when the score of any confectionery shop or factory shall fall below 60, the license of such confectionery shop or factory will be suspended and the confectionery from such shop or factory will be deemed as having been produced under unsanitary conditions, the sale of which is contrary to law.

When a confectionery shop or factory license has been suspended for any cause, the Secretary of the State Board of Health shall notify the owner or proprietor of such confectionery shop or factory of the time and place of the next meeting of the State Board of Health, and the owner or proprietor of such confectionery shop or factory shall have the privilege of appearing before said Board of Health to show cause why the license of such confectionery shop or factory should not be revoked.

Regulation. 78. These regulations must be posted in a conspicuous place in every confectionery shop or factory.

REGULATIONS FOR HOTEL, RESTAURANT, AND LUNCH COUNTER KITCHENS.

Regulation 79. The side walls and ceiling of every hotel, restaurant or lunch counter kitchen shall be well plastered, wainscoted or sealed with metal or lumber and shall be oiled, painted or kept well lime washed and all interior wood work shall be kept well oiled or painted with oil paints, which shall be kept washed with clean soap and water. The floors of every kitchen shall be made of cement, or tile laid in cement, brick, oiled wood or other suitable non-absorbant material, and must be flushed and washed clean with water at least once in every twenty-four (24) hours and as much more frequently as may be necessary to keep such floor in a clean and sanitary condition.

Regulation 80. The doors, windows and other openings of every kitchen used in connection with any hotel, restaurant or lunch counter shall be fitted with a self-closing screen door, and wire window screens of not coarser than 14 mesh wire gauze.

Regulation 81. Every such kitchen shall be provided with convenient toilet room, which must not be in any way directly connected with the kitchen. Such toilet room shall be furnished with a ventilating flue or pipe, which shall in no way connect with the ventilating system of the kitchen. Every toilet room must have adjacent to it a lavatory or wash room, which must be supplied with wash basins, soap, pure water and clean towels. All employes who in any way handle or come in contact with the foods prepared in such kitchen must before beginning work or after visiting toilet wash their hands and arms in clean water.

Regulation 82. No person or persons shall be allowed to sleep in any kitchen in connection with any hotel, restaurant or lunch counter.

Regulation 83. No person having any communicable disease and no person who has been exposed to any contagious or infectious disease shall be employed in or permitted to work in any kitchen mentioned above until such person presents a written statement from a health officer showing that he has been properly disinfected and that there is no longer any danger of his transmitting a communicable disease.

Regulation 84. All pots, pans, kettles and other utensils used in or about the kitchen must at all times be kept in a clean and sanitary condition.

Regulation 85. All refuse matter must be kept in a covered receptacle securely protected from flies, which receptacle must be emptied and washed daily.

Regulation 86. Throwing slops, wash water, or any other refuse matter on the ground outside of the kitchen door shall be deemed to produce an unsanitary condition and such practice will result in the revocation of the license authorizing the conducting of such kitchen.

Regulation 87. Refrigerators—All refrigerators and ice boxes must at all times be kept in a clean and sanitary condition and free from foul odors. Milk stored in refrigerators must be so placed that it will not absorb odors from other food products stored therein. Nothing but foods or food products shall be placed in any such refrigerator.

Regulation 88. Store Rooms—All store rooms in which food products are stored must be well lighted and ventilated and at all times be kept in a clean and sanitary condition, so screened that flies cannot secure access thereto and kept free from any foul odor.

Regulation 89. All kitchens shall be inspected at regular intervals by local and county health officers and special inspectors, and when inspected will be scored according to the score card which is a part of these regulations. When the score of any kitchen shall fall below 70, but shall reach 60 or more, the owner or proprietor of such kitchen will receive a warning note, and if on subsequent inspection the score shall again fall below 70 or when the score of any kitchen shall fall below 60, the license of such kitchen will be revoked and food produced from such kitchen will be deemed as having been produced under unsanitary conditions, the sale of which is contrary to law.

When a kitchen license is suspended for any cause, the Secretary of the State Board of Health shall notify the owner or proprietor of such kitchen of the time and place of the next meeting of the State Board of Health, and the owner or proprietor of such kitchen shall have the privilege of appearing before said Board of Health to show cause why the license of such kitchen should not be revoked.

Regulation 90. These regulations must be posted in a conspicuous place in every kitchen.

REGULATIONS FOR BAKE SHOPS.

Regulation 91. Any room in which any dough, pastry or other food product is prepared for baking must be well ventilated and lighted. The floors must be of cement, tile, oiled wood or other impervious material. The walls and ceiling must be painted or lime washed. Walls, ceilings, floors, boxes, pans, machines,. and all other utensils used in mixing, baking, or in handling in any way any bread, cake, pies, doughnuts, or other food produced must be kept in a clean and wholesome condition at all times. No closet or lavatory shall be directly connected with the working room of any bake shop.

Regulation 92. Before beginning work and before preparing and mixing the ingredients, all persons engaged in the work must wash their hands and arms thoroughly in clean water. For this purpose sufficient wash basins, together with soap, pure water and clean towels, must be provided.

Regulation 93. Persons employed in the establishment must, while working, wear clean clothing, preferably white suits.

Regulation 94. No person having any communicable disease and no person who has been exposed to any contagious or infectious disease shall be employed in or permitted to work in any bakery until such person presents a written statement from a health officer showing that he has been properly disinfected and that there is no longer any danger of his transmitting a communicable disease.

Regulation 95. All windows and doors must be protected from flies by the use of screens made from not less than 14 mesh wire gauze.

Regulation 96. The supplies must be stored in dry places, where they are protected from all contamination. Water used to coat the bread must be provided fresh each day and must come from an uncontaminated source.

Regulation 97. The bread, pastry, and other food products must at all times be handled in a clean and sanitary manner and must be protected from flies and other sources of contamination.

Regulation 98. It is strictly forbidden for any person to sit or lie on any of the tables, shelves, etc., which are intended for the dough or baked articles. Chairs and benches in sufficient number must be provided to sit on.

Regulation 99. The working room must be furnished with cuspidors, at least one in each room, which must be cleaned daily. Spitting on the floor is forbidden. Smoking, in the working rooms is prohibited.

Regulation 100. Working rooms must not be used for any purpose other than those strictly connected with the preparing and baking of food.

Regulation 101. Domestic animals must not be allowed in the bake shop.

Regulation 102. Any bread, pastry or other bake-shop product showing dirt or filth shall be deemed as an impure food product, the sale of which is prohibited by law.

Regulation 103. Refrigerators—All refrigerators and ice boxes must at all times be kept in a clean and sanitary condition and free from foul odors. Milk stored in refrigerators must be so placed that it will not absorb odors from other food products stored therein. Nothing but foods or food products shall be placed in any such refrigerators.

Regulation 104. Store-Rooms—All store-rooms in which food products are stored must be well lighted and ventilated and at all times be kept in a thoroughly clean and sanitary condition so screened that flies cannot secure access thereto and kept free from any foul odor.

BAKERIES.

Regulation 105. Bread labeled or offered for sale as "rye bread," "Whole Wheat Bread," or other name indicating a special kind of flour which is not entirely from rye-flour, whole wheat flour or other flour indicated by the name used in the sale of the bread shall be deemed as misbranded unless the word "Compound" or "Mixture" is used on the label or in designating the character of the bread.

Regulation 106. All bakeries shall be inspected at regular intervals by local and county health officers and special inspectors, and when inspected will be scored according to the score card which is part of these regulations. When the score card of any bakery shall fall below 70, but shall reach 60 or more, the owner or proprietor of such bakery will receive a warning note, and if on subsequent inspection, the score shall again fall below 70, or when the score of any bakery shall fall below 60, the license of such bakery will be suspended and bread, cake, pies, doughnuts or other food products from such bakery will be deemed as having been produced under unsanitary conditions, the sale of which is contrary to law.

When a bakery license is suspended for any cause the Secretary of the State Board of Health shall notify the owner or proprietor of such bakery of the time and place of the next meeting of the State Board of Health, and the owner or proprietor of such bakery shall have the privilege of appearing before said Board of Health to show cause why the license of such bakery should not be revoked.

Regulation 107. These regulations must be posted in a conspicuous place in every bake shop or bakery.

REGULATIONS FOR HOTEL, RESTAURANT, AND LUNCH COUNTER DINING ROOMS.

Regulation 108. The dining room of every hotel or restaurant and every lunch counter must be thoroughly protected from flies by the use of efficient fly screens made from not coarser than 14 mesh wire gauze placed at all the windows and doors.

Regulation 109. The floors, side walls, ceilings, and all wood work in such dining rooms or lunch counters must at all times be kept in a clean and sanitary condition.

Regulation 110. All tables, counters, dishes, napery, etc., used in any such dining room or lunch counter must at all times be clean and free from any filth of any kind whatsoever.

Regulation 111. No person suffering from a communicable disease shall be employed in any hotel, restaurant, dining room, or lunch counter and no person suffering from or who has been exposed to any contagious or infectious disease shall be permitted in any hotel, or restaurant, dining room or lunch counter until such person presents a statement from a Health Officer stating that such person has been thoroughly disinfected and that there is no longer any danger of his transmitting a communicable disease.

Regulation 112. All refrigerators, pantries, and other places in which foods or food products are stored or kept, must at all times be kept in a thoroughly clean and sanitary condition and nothing but pure, clean, wholesome foods or food products, or ice shall be placed in any such refrigerator, pantry, or other place where food products are kept.

Regulation 113. All dining rooms of every hotel or restaurant and every lunch counter shall be thoroughly inspected at regular intervals by local and county health officers and special inspectors, and when inspected will be scored according to the score card which is part of these regulations. When the score of any dining room or lunch counter shall fall below 70, but shall reach 60 or more, the owner or proprietor of such dining room or lunch counter will receive a warning note, and if on subsequent inspection, the score shall again fall below 70, or when the score of any dining room, restaurant or lunch counter shall fall below 60, the license of such dining room, restaurant or lunch counter will be suspended and food products from such dining room, restaurant or lunch counter will be deemed as having been produced under unsanitary conditions, the sale of which is contrary to law.

When a hotel, restaurant, or lunch counter dining room license is suspended for any cause, the Secretary of the State Board of Health shall notify the owner or proprietor of such hotel, restaurant, or lunch counter dining room of the time and place of the next meeting of the State Board of Health, and the owner or proprietor of such hotel, restaurant, or lunch counter dining room shall have the privilege of appearing before said Board of Health to show cause why the license of such hotel, restaurant, or lunch counter dining room should not be revoked.

Regulation 114. These regulations must be posted in a conspicuous place in every hotel dining room, restaurant or lunch counter.

TABLE XIII.—NUMBER OF INSPECTIONS REPORTED TO THE STATE BOARD OF HEALTH FROM JAN. 1st, 1912, TO SEPT. 30th, 1912, ARRANGED ACCORDING TO COUNTIES AND PRINCIPAL CITIES.

COUNTY.	Dairies.	Hotels and Restaurants.	Meat Markets and Slaughter Houses.	Confectioneries and Bake Shops.	*Other Places of Business.
Beaverhead	15	74	22	4	30
Blaine	67	109	36	2	54
Broadwater	98	32	18	3	30
Carbon	199	126	96	38	115
Cascade (Excl. of)	101	26	36	9	26
Great Falls	9	191	68	66	14
Chouteau	10	46	7	13	41
Custer	18	115	24	29	35
Dawson	145	144	71	24	71
Deer Lodge (Excl. of)	132	....	9	....	....
Anaconda	52	105	70	43	134
Fergus	131	310	120	112	203
Flathead (Excl. of)	61	139	57	15	77
Kalispell	8	61	20	20	12
Gallatin (Excl. of)	249	110	85	3	116
Bozeman	225	77	40	45	96
Granite	38	16	15	4	1
Hill	41	189	10	3	26
Jefferson	2	36	13	5	1
Lewis and Clark (Excl. of)	62	4	14	2	....
Helena	64	144	72	41	21
Lincoln	9	46	34	7	8
Madison	301	130	41	1	86
Meagher	106	161	90	29	53
Missoula (Excl. of)	87	97	36	2	26
Missoula City	64	255	62	62	7
Musselshell	8	59	35	13	30
Park (Excl. of)	139	59	22	....	6
Livingston	254	148	39	26	123
Powell	13	39	14	14	31
Ravalli	396	125	84	44	95
Rosebud	13	80	22	8	12
Sanders	31	160	69	23	105
Silver Bow (Excl. of)	669	117	130	26	243
Butte	24	528	198	146	578
Sweet Grass	126	30	19	8	27
Teton	46	209	49	33	103
Valley	85	242	86	25	128
Yellowstone (Excl. of)	240	138	56	14	55
Billings	....	134	37	31	10
Totals	4466	4811	2026	993	2829

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*Other Places of Business includes: Grocery Stores, Milk Depots, Creameries, Soda Fountains, Ice Cream Parlors, and other places of similar character.

TABLE XIV.—MEAT MARKETS AND SLAUGHTER HOUSES.

COUNTY.	Number of Meat Markets and Slaughter Houses.	Number of Inspections.	Average Inspection.	Highest Grade.	Lowest Grade.
Beaverhead	15	22	1.4	100	35
Blaine	10	40	4.0	100	66
Broadwater	12	32	1.8	100	74
Carbon	29	100	3.4	100	38
Cascade	59	104	1.9	100	55
Chouteau	6	25	4.1	100	55
Custer	14	24	1.7	100	43
Dawson	24	70	2.9	95	20
Deer Lodge	14	83	5.9	95	70
Fergus	35	120	3.4	100	29
Flathead	26	57	2.1	100	30
Gallatin	30	145	4.8	100	30
Granite	6	15	2.5	83	30
Hill	19	55	2.8	100	45
Jefferson	10	12	1.2	95	63
Lewis and Clark	33	86	2.6	100	45
Lincoln	9	17	1.8	100	70
Madison	16	41	2.5	100	40
Meagher	19	90	4.7	100	36
Missoula	34	98	2.8	100	47
Musselshell	23	35	1.5	100	35
Park	13	56	4.3	100	64
Powell	16	20	1.3	100	64
Ravalli	18	84	4.6	100	47
Rosebud	6	22	3.6	100	83
Sanders	16	67	4.1	100	65
Silver Bow	90	305	3.3	100	28
Sweet Grass	10	19	1.9	100	75
Teton	20	48	2.4	100	35
Valley	40	86	2.1	100	25
Yellowstone	43	95	2.2	100	50
Totals	715	2073	2.8	98	48

TABLE NO. XV.—CONFECTIONERIES AND BAKE SHOPS, UP TO AND INCLUDING SEPTEMBER 30, 1912.

COUNTY.	Number of Confectioneries and Bake Shops.	Number of Inspections.	Average Inspection per Confectionery and Bake Shops.	Highest Grade.	Lowest Grade.
Beaverhead	4	4	1.0	100	95
Blaine	3	2	.6	100	88
Broadwater	2	3	1.5	97	81
Carbon	8	38	4.7	100	81
Cascade (Excl. of)	4	9	2.2	88	71
Great Falls	15	66	4.4	100	60
Chouteau	3	5	1.6	100	89
Custer	9	29	3.2	100	74
Dawson	8	24	3.0	89	40
Deer Lodge (Excl. of)	....	....	....	...	....
Anaconda	5	43	8.6	100	78
Fergus	15	62	4.1	100	62
Flathead (Excl. of)	8	15	1.8	100	54
Kalispell	6	20	3.3	100	64
Gallatin (Excl. of)	3	3	1.0	100	100
Bozeman	6	45	7.5	100	73
Granite	7	4	.5	100	83
Hill	4	10	2.5	94	61
Jefferson	5	2	.4	91	79
Lewis and Clark (Excl. of)	2	2	1.0	89	89
Helena	14	40	2.8	100	74
Lincoln	2	7	3.5	90	66
Madison	1	1	1.0	94	94
Meagher	6	26	4.3	95	63
Missoula (Excl. of)	3	2	.6	87	83
Missoula City	10	62	6.2	100	65
Musselshell	5	13	2.6	95	67
Park (Excl. of)	1	1	1.0	87	87
Livingston	5	23	4.6	98	82
Powell	5	8	1.6	100	89
Ravalli	9	55	6.1	100	64
Rosebud	3	8	2.6	96	90
Sanders	14	23	1.6	100	25
Silver Bow (Excl. of)	3	15	5.0	100	65
Butte	31	146	4.7	100	50
Sweet Grass	1	8	8.0	100	90
Teton	12	31	2.5	100	75
Valley	18	25	1.3	99	65
Yellowstone (Excl. of)	5	14	2.8	96	64
Billings	15	28	1.8	100	83
Totals	281	922	3.2	96	73

TABLE NO. XVI.—DAIRIES.

COUNTY.	Places Reported Selling Milk or Butter.	Number of Dairies Inspected.	Number of Inspections.	Average No. of Inspections per Dairy.	Licensed Dairies Not Inspected.	Highest Grade.	Lowest Grade.	No. of Cows Reported.	No. of Cows Tested.	No. of Cows Reacting.	Percent of Reactors.
Beaverhead	75	12	15	.20	43	100	81	205	69	1	1.4
Blaine	70	45	55	.78	28	100	57	289	......	....	....
Broadwater	130	71	81	.63	55	100	75	576	389	1	.2
Carbon	279	129	199	.71	157	100	23	724	39	....	....
Cascade	332	27	111	.33	273	98	46	906	887	101	11.3
Chouteau	12	5	10	.83	9	92	64	24	......	....	....
Custer	93	17	18	.19	72	99	35	247	201	1	.4
Dawson	70	46	145	2.07	16	95	23	253	64	....	....
Deer Lodge	66	56	184	2.79	2	99	52	862	745	146	19.5
Fergus	147	68	151	1.02	66	100	61	539	284	1	.3
Flathead	290	41	38	.13	127	97	52	1.043	805	10	1.2
Gallatin	274	175	454	1.65	149	98	50	1.366	562	4	.7
Granite	61	29	38	.62	33	95	43	231	......	....	....
Hill	25	12	74	2.96	12	94	37	84	......	....	....
Jefferson	81	3	....	....	69	90	72	489	444	200	45.4
Lewis and Clark	176	54	126	.71	95	100	58	1.149	971	26	2.6
Lincoln	17	3	9	.52	13	95	81	8	......	....	....
Madison	249	78	291	1.16	147	100	69	705	299	10	3.3
Meagher	73	59	104	1.42	8	100	59	266	78	11	14.1
Missoula	175	49	151	.86	80	100	64	964	1,887	79	4.2
Musselshell	23	2	8	.34	18	100	81	120	87	3	3.4
Park	184	118	390	2.12	55	100	72	960	361	58	16.0
Powell	108	3	14	.12	92	95	75	588	590	10	1.6
Ravalli	486	270	446	.91	200	100	50	1.978	720	41	5.6
Rosebud	7	3	13	1.85	3	96	59	37	......	....	....
Sanders	39	5	30	.76	29	100	78	45	......	....	....
Silver Bow	240	125	683	2.84	57	100	23	2.022	2,643	613	23.1
Sweet Grass	20	66	126	6.30	47	100	64	450	......	....	....
Teton	59	14	101	1.71	45	100	47	90	......	....	....
Valley	55	31	85	1.54	25	100	53	179	6	....	....
Yellowstone	200	90	240	1.20	90	100	69	914	635	8	1.2
Totals	4116	1706	4390	1.06	2115	98	24	18.503	13.739	1324	9.6

NOTE—In the number of places reported selling milk or butter there are 303 included where butter only is made and sold.

TABLE XIII.—HOTELS AND RESTAURANTS UP TO AND INCLUDING SEPTEMBER 30, 1912.

COUNTY.	Number of Hotels and Restaurants.	Number of Inspections.	Average Inspection per Hotel and Restaurant.	Highest Grade.	Lowest Grade.
Beavearhead	46	74	1.60	100	44
Blaine	31	104	3.35	100	67
Broadwater	15	28	1.86	100	72
Carbon	41	163	3.97	100	66
Cascade (Excl. of)	30	26	.86	93	59
Great Falls	60	201	3.65	100	51
Chouteau	16	101	6.31	100	71
Custer	47	115	2.44	100	68
Dawson	39	114	2.92	100	28
Deer Lodge (Excl. of)	2	....	....	....	....
Anaconda	14	105	7.50	100	51
Fergus	71	312	4.39	100	63
Flathead (Excl. of)	48	139	2.89	100	61
Kalispell	18	61	3.38	100	47
Galiatin (Excl. of)	44	110	2.50	100	43
Bozeman	21	77	3.65	100	80
Granite	14	16	1.14	100	84
Hill	59	184	3.12	100	52
Jefferson	25	32	1.28	98	75
Lewis and Clark (Excl. of)	5	4	.80	80	80
Helena	49	144	2.93	100	66
Lincoln	20	46	2.30	95	63
Madison	30	130	4.33	100	53
Meagher	28	161	5.75	97	58
Missoula (Excl. of)	48	97	2.02	100	60
Missoula City	52	355	6.82	100	40
Musselshell	29	59	2.03	100	42
Park (Excl. of)	21	59	2.80	100	84
Livingston	19	124	6.52	100	72
Powell	22	39	1.77	100	36
Ravalli	26	125	4.80	100	74
Rosebud	36	80	2.22	100	46
Sanders	34	154	4.52	100	16
Silver Bow (Excl. of)	18	115	6.38	100	53
Butte	133	529	3.97	100	43
Sweet Grass	9	33	3.66	100	82
Teton	62	203	3.27	100	60
Valley	92	242	2.63	100	35
Yellowstone (Excl. of)	55	138	2.50	100	27
Billings	49	134	2.73	100	65
Totals	1278	4933	3.85	100	16

SPECIAL INSPECTIONS MADE FROM APRIL 1st TO SEPTEMBER 30th, INCLUSIVE.

COUNTY.	Total Number of Inspections.	Number of Dairies Inspected.	Number of Hotels and Restaurants Inspected.	Number of Meat Markets and Slaughter Houses Inspected.	Number of Confectioneries and Bake Shops Inspected.	Other Places of Business Inspected.
Beaverhead	....	....	....	....	....	....
Blaine	13	....	10	....	....	3
Broadwater	45	27	7	8	1	2
Carbon	80	38	18	16	2	6
Cascade	115	19	53	21	19	3
Chouteau	17	2	9	3	1	2
Custer	13	6	3	2	1	1
Dawson	64	24	15	11	5	9
Deer Lodge	67	40	12	11	4	....
Fergus	37	10	14	5	3	5
Flathead	85	11	34	16	9	15
Gallatin	70	14	26	17	7	6
Granite	....	....	....	....	....	....
Hill	58	12	25	13	3	5
Jefferson	34	5	18	8	3	....
Lewis and Clark	96	47	29	12	8	....
Lincoln	....	....	....	....	....	....
Madison	....	....	....	....	....	....
Meagher	35	5	15	9	1	5
Missoula	17	1	7	6	....	3
Musselshell	37	5	15	11	2	4
Park	35	10	17	5	3	....
Powell	36	6	12	9	4	5
Ravalli	76	31	16	12	4	13
Rosebud	6	1	3	1	1	....
Sanders	20	4	7	7	2	....
Silver Bow	....	....	....	....	....	....
Sweet Grass	14	2	4	4	1	3
Teton	75	14	41	10	7	3
Valley	63	9	33	10	1	10
Yellowstone	78	11	39	18	5	5
Totals	1286	354	482	245	97	108

NOTE—Other Places of Business includes Grocery Stores, Milk Depots, Creameries, Soda Fountains, Ice Cream Parlors, and other places of similar character.

THE WORK OF THE LABORATORY.

Under the Pure Food law the Professor of Chemistry at the State Agricultural College is made the Chemist to the State Board of Health, and is required to make all analyses of foods, drugs, etc. For this purpose he is allowed one assistant at $1,500 per year. With his duties as Professor of Chemistry at the College it is natural he cannot devote a great deal of his personal time to this work, hence practically all the analyses of foods, etc., must be made by the one assistant allowed, such unpaid assistants as can be secured from the classes.

Notwithstanding this lack of sufficient help, the following report from the laboratory shows a remarkable amount of work performed when compared with the work performed in other States with large forces employed in the laboratory. With the small force of men employed in the laboratory, we of course were not able to go extensively into all lines of food products and were not able to even touch the subject of drugs. Deeming it advisable to do thorough work along some particular line, we took up the study of milk and milk products and have gone very thoroughly into this subject, at the same time purchasing and submitting for analyses other food products as the work of the laboratory would permit. But even with this limiting of our field of work, the laboratory has been and is at this time swamped with work and yet not more than one-fourth of the samples have been submitted for analysis that we would have liked to have submitted. We have asked Prof. Cobleigh to submit an estimate of the necessary expenses for the next two years in order to carry on work efficiently. He estimates that it will require at least $5,000 per year to secure sufficient help to carry on the work under the Pure Food law.

The present arrangement of having the laboratory located at the Agricultural College is fairly satisfactory, but we believe that with a laboratory located at the Capitol here, the State Health Officer can be in constant touch with the chemist, and time would be frequently saved in matters demanding immediate attention. The health officer should at all times be in close touch with the laboratory department.

The following report of the Chemist shows the amount of work done from January 1st, to September 30th, 1912, but it does not show one important feature, namely, that whereas the first samples of food products purchased in nearly every community were found to run below standard, the second sample purchased in every community were rarely below standard. A warning given as result of the first finding of the food products below standard immediately resulted in such product being brought up to the standard required by law.

It is impossible to estimate the amount of butter alone that the people of this State have received for the same money because of the improved standard of milk quality resulting from these examinations, but it certainly amounts to more than the entire cost of the Public Health Department.

REPORT OF THE CHEMIST TO THE STATE BOARD OF HEALTH.

Dr. T. D. Tuttle, Secretary of the State Board of Health,
Helena, Mont.

Dear Sir:

I have the honor of submitting below a brief report indicating the analytical work performed in the State Board of Health Food and Drug Laboratory from Jan. 2, 1912, to Nov. 15, 1912.

In accordance with the provisions of Sec. 13, of the Montana Food and Drug Act, Chapter 130, Session Laws 1911, a State Laboratory for analyzing foods, drugs, and water was opened on January 2, 1912. The law provides that this laboratory shall be located at the Bozeman State College of Agriculture and Mechanic Arts, Bozeman, and consequently President J. M. Hamilton of the college authorized the following organization of the laboratory staff:

W. M. Cobleigh, Chemist.
C. E. Mollet, Director of Drug Analyses.
D. L. Weatherhead, Analyst.
D. B. Swingle, Bacteriologist.
H. M. Jennison, Assistant Bacteriologist.
Carl Gottschalck, Assistant in Chemistry.
Ella Olson, Clerk and Stenographer.

With the exception of Mr. Weatherhead, Mr. Gottschalck and Miss Olsen, the laboratory staff are members of the college faculty and their time is occupied primarily with teaching. The faculty members of the staff, however, act in an executive and advisory capacity without extra pay from the State. This organization gives an efficient laboratory force at a minimum expense, and makes it possible through the co-operation arranged between the heads of the Departments of Pharmacy, Bacteriology and Chemistry to broaden the field of work that can be covered.

The salaries of Mr. Weatherhead, Mr. Gottschalck and Miss Olsen are the only salaries paid in full or in part by funds provided by the food law. Mr. Weatherhead was elected to the position of analyst while employed as a chemist in the U. S. Food Inspection Laboratory at New York City. He is given the direct responsibility of making the analyses and reports on the samples collected and submitted by the State Board of

Health. He is assisted by Mr. Gottschalck in the analyses of both foods and water.

The Agricultural College furnishes the laboratory and office rooms, ample library facilities, and the equipment for the laboratory. The supplies and chemicals required have been purchased by funds provided by the food law.

Detailed statements of the analyses of food products made to date have been published month by month in the State Board of Health Bulletin. In this report only a brief summary will be given.

MILK.

According to the standard adopted "adulterated milk is milk containing more than eighty-eight (88) per cent water and less than eleven and three-quarters (11.75) per cent of total solids, eight and one-half (8.5) per cent of solids not fat, and three and one-quarter (3.25) per cent fat; milk which has been diluted with water or into which has been introduced any foreign substance whatever. This includes all substances added for the purpose of preserving, coloring and thickening milk or cream; or milk handled in an unsanitary manner or contrary to the rules and regulations of the State Board of Health."

SUMMARY OF MILK SAMPLES ANALYZED.

	No.
Normal	397
Below standard in fat	133
Below standard in solids	51
*Unofficial	100
Preservatives	1
Broken in Shipment	8
	690

*Samples that were soured or churned on reaching the laboratory, were classified as unofficial.

The table following is a summary of the milk samples classified according to the large cities and counties.

	Number Normal.	Number Low in Fat.	Number Low in Solids.	Number Unofficial.	Number Containing Preservatives.	Number Broken in Shipment.
Beaverhead	....	....	....	....	....	....
Broadwater	....	....	....	....	....	....
Carbon	10	2	1	8	....	....
Cascade (Excl. of)	1	....	....	1	....	....
Great Falls	29	14	9	14	....	1
Chouteau	10	3	....	15	....	2
Custer	29	3	3	1	....	....
Dawson	10	7	1	6	....	1
Deer Lodge (Excl. of)	....	....	....	....	....	....
Anaconda	23	11	9	5	....	....
Fergus	19	7	1	7	....	....
Flathead (Excl. of)	3	4	....	3	....	1
Kalispell	13	2	....	10	....	....
Gallatin (Excl. of)	2	1	....	5	....	....
Bozeman	18	6	....	1	....	....
Granite	....	....	....	....	....	....
Jefferson	....	....	....	....	....	....
Lewis and Clark (Excl. of)	....	....	....	....	....	....
Helena	58	3	2	4	....	....
Lincoln	4	1	....	....	....	....
Madison	....	....	....	....	....	....
Meagher	2	2	....	....	....	....
Missoula (Excl. of)	4	....	....	....	....	....
Missoula City	23	3	2	....	....	....
Musselshell	....	....	....	....	....	....
Park (Excl. of)	....	....	....	....	....	....
Livingston	13	2	....	....	1	1
Powell	....	....	....	....	....	....
Ravalli	20	4	1	4	....	....
Rosebud	9	5	1	1	....	....
Sanders	....	....	....	....	....	....
Silver Bow (Excl. of)	1	....	....	....	....	....
Butte	29	32	16	1	....	1
Sweet Grass	5	1	....	....	....	....
Teton	12	5	....	6	....	....
Valley	7	7	....	2	....	....
Yellowstone (Excl. of)	12	2	1	3	....	....
Billings	26	9	3	2	....	....
Totals	397	133	51	100	1	8

CREAM

According to the standard adopted "cream is that portion of milk, rich in milk fat, which rises to the surface of milk on standing, or is separated from it by centrifugal force, is fresh and clean and contains not less than twenty (20) per cent of milk fat."

SUMMARY OF CREAM SAMPLES ANALZED.

	No.
Normal	122
Below standard in fat	25
Unofficial	34
Contain preservatives	3
	184

ICE CREAM.

"Ice cream is a frozen product made from cream, gelatine and sugar, with or without flavoring, and contains not less than fourteen (14) per cent of milk fat and not more than eight-tenths (.8) per cent pure gelatine."

SUMMARY OF ICE CREAM SAMPLES ANALYZED.

	No.
Normal	53
Below standard in fat	37
Unofficial	7
Contain preservatives	2
	99

BUTTER.

"Butter is the clean, non-rancid product made by gathering in any manner of fresh or ripened milk or cream in a mass, which also contains a small portion of other milk constituents, with or without salt or added coloring matter, and contains not less than eighty-two and five-tenths (82.5) per cent of milk fat."

SUMMARY OF BUTTER SAMPLES ANALYZED.

	No.
Total number of samples	365
Normal	272
Below standard in fat	87
Underweight	246

LARD.

"Lard is the rendered, fresh fat from hogs in good health at the time of slaughter, is clean, free from rancidity, and contains, necessarily incorporated in the process of rendering, not more than one (1) per cent of substance other than fatty acids and fat."

Leaf lard is lard rendered at moderately high temperatures from the internal fat of the abdomen of the hog, excluding that adherent of the intestines, and has an iodin number not greater than sixty (60).

Neutral lard is lard rendered at low temperatures.

SUMMARY OF LARD SAMPLES ANALYZED.

	No.
Normal	14
Contain beef fat	7
	21

SOFT DRINKS.

SUMMARY OF SOFT DRINKS ANALYZED.

	No.
Normal	9
Contain saccharin	15
Broken in shipment	1
	25

CATCHUP.

"Catchup (ketchup, catsup), is the clean, sound product made from the properly prepared pulp of clean, sound, fresh, ripe tomatoes with spices, and with or without sugar or vinegar; mushroom catchup, walnut catchup, et cetera, are catchups made as above described, and conform in name to the substances used in their preparation."

Two samples of catchup were analyzed and found to be normal.

SAUSAGE.

"Sausage or sausage meat shall be held to be a comminuted meat from meat cattle or swine, or a mixture of such meats, either fresh, salted, pickled or smoked, with added salt and spices and with or without the addition of edible animal fats, blood and sugar, or subsequent smoking. It shall contain no larger amount of water than the meats from which it is prepared contain when in their fresh condition, and if it bears a name descriptive of kind, composition, or origin, it must correspond to such descriptive name. All animal tissues used as containers, such as casing, stomachs, etc., must be clean and sound and impart to the contents no other substance than salt. All sausage found to contain any cereal, or added water, or other substance, except as herein stated, shall be deemed as adulterated."

Two samples of sausage were analyzed and found to contain added color.

Three samples of Hamburg steak were analyzed and found to contain no harmful ingredients, and were classed as legal.

MISCELLANEOUS AND UNOFFICIAL SAMPLES.

Considerable work has been done on miscellaneous samples. The question of the use of viscogen or calcium sucrate in cream has been investigated. Samples of aniline dyes intended for use in coloring egg noodles have been studied and opinions rendered on their use. A thickener intended for use in the manufacture of ice cream was found to be composed of a mixture of gum and sugar: "The gum is a second grade tragacanth or tragacanth with adulteration of similar gums." The sample could not be used legally in preparing ice cream for the market.

A sample of Freezine was examined for formaldehyde and precautions in the use of same for washing milk cans was given. A sample of Cold Storine used for the preservation of meat was found to be largely common salt and saltpeter. An opinion was rendered on the use of this preservative for meats.

A sample of Mrs. Price's Canning Compound was analyzed and it was found that it was composed of boric acid entirely, or possibly with a mixture of a small amount of borax.

A few samples of whiskey were analyzed for harmful ingredients. Negative results were obtained in all cases.

WATER.

A total of thirty-four (34) water samples were analyzed chemically and most of the samples were tested by Professor Swingle bacteriologically. Twelve (12) were pronounced suspicious and twenty-two (22) were considered safe for domestic use.

For several years before the Board of Health laboratory was established at the college, a good many sanitary analyses of water were made by the Departments of Bacteriology and Chemistry. With the co-operation of Dr. Tuttle and with funds provided by the Board of Health, a sanitary survey of the Yellowstone River was conducted in the summer of 1910. The complete report on this survey was published in the last biennial report of the Board of Health. Analyses have been made of the city supplies of the State to determine their sanitary qualities so that the data obtained by testing supplies of known purity could be used in the study of waters that are considered to be the source of infection.

A large number of surface waters have been analyzed in various parts of the State and considerable progress in the study of the sanitary qualities of farm wells has been made. All of this data is on record in the office of the Secretary of State Board of Health and forms a valuable record for reference. Many of the analyses have been published in the monthly bulletin of the Board of Health.

INVESTIGATION.

Considerable time has been devoted to the investigation and study of methods suitable for food and water analysis. Mr. Weatherhead prepared an extensive report on the methods of identification and separation of aniline colors for the Association of Official Agricultural Chemists. This society adopts the official methods of analysis.

Professor Swingle and his assistants have devoted a great deal of time and energy to perfecting bacteriological methods of testing water and sewage suitable to conditions found in Montana. Much valuable data has been secured.

Modifications in the routine chemical methods of analyzing water have been worked out, with the assistance of Mr. Gottschaick, suitable to local conditions, which facilitates the work in this department materially.

INCOMPLETE WORK.

A variety of samples are now in the laboratory and considerable work has been done on these samples, but a final report cannot be made at this time.

It should be borne in mind that while the laboratory was opened January 2, 1912, it was necessary to do considerable preliminary work before official samples could be received. Therefore, this report dated November 15th, includes the work done in nine and a half months of the calendar year.

Respectfully submitted,

W. M. COBLEIGH.

Bozeman, Montana, November 15th, 1912.

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